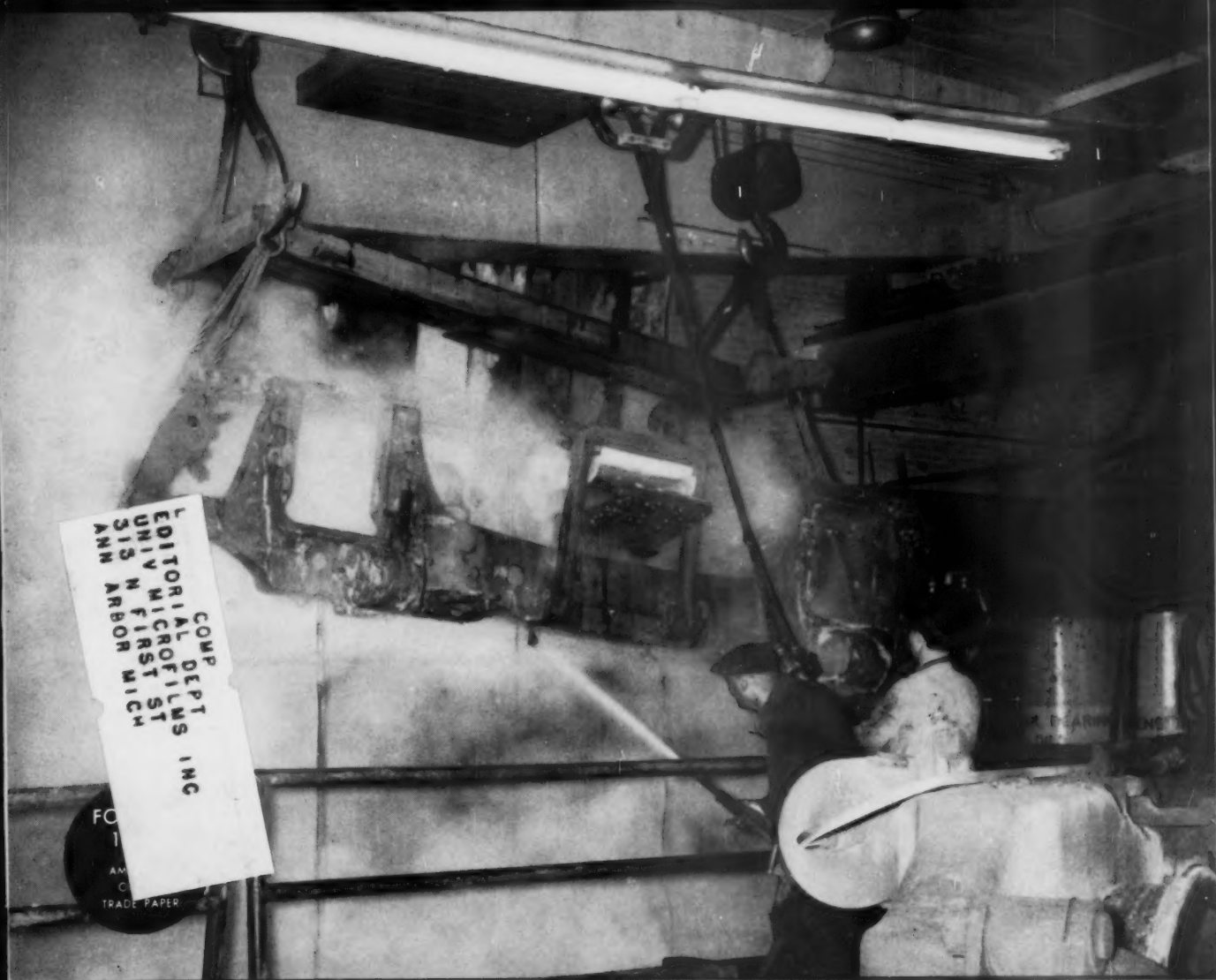
Stainless Steel Covered Hopper

... page 20

REA Express Container Cars

... page 34

RAILWAY
LOCOMOTIVES AND CARS
MAY 1961



COMP
EDITORIAL DEPT
UNIV MICROFILMS INC
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Milwaukee Truck Repair Shop... page 17

Performance Report of General Electric's New U25B on the Great Northern

5459 TONS–164 MILES–AVG. 41 MPH

SERVICE HISTORY—As part of a demonstration program on major U.S. railroads, two General Electric U25B locomotives, like those above, recently completed 5588 miles on the Great Northern Railway, hauling a total of 312,498,000 gross ton-miles between Union Yard in the Twin Cities and Whitefish, Montana.

SCHEDULE PERFORMANCE—Fewer units powered the Great Northern's high-speed main-line freight service and still maintained established schedules with the U25B locomotive's 2500 hp on four axles. A typical run showed these results:

New Rockford, N. D.—Breckenridge, Minn., 164 miles, 0.3% ruling grade
Two U25B's—80 loads, 10 empties, 5188 trailing tons, 5459 gross tons, 164 miles

Elapsed time 4'00"	—41.0 mph average
Balance Speed	—34.5 mph on + 0.3%
GTM per train hour	—223,819

GREAT NORTHERN COMMENTS—**THE CENTRAL-DUCT AIR SYSTEM** supplied abundant clean air throughout the locomotive, even in a dust storm at Lothair, Montana. A later routine check found the electrical equipment as clean as when installed. Particularly noted by the enginemen: the few wheel slips that occurred were quickly corrected by automatic momentary application of independent brakes.

THE U25B UNITS rode well under all track and speed conditions. The turbo-charged engines operated with clear exhaust stacks at all loads and altitudes. The two units multipled well with other motive-power units.

LUBE-OIL CONSUMPTION was low; fuel consumption proved favorable during the Great Northern testing period.

For information on how G.E.'s performance-proved U25B can cut operating costs and build new profits for your railroad, contact your General Electric Sales Engineer.

117-01

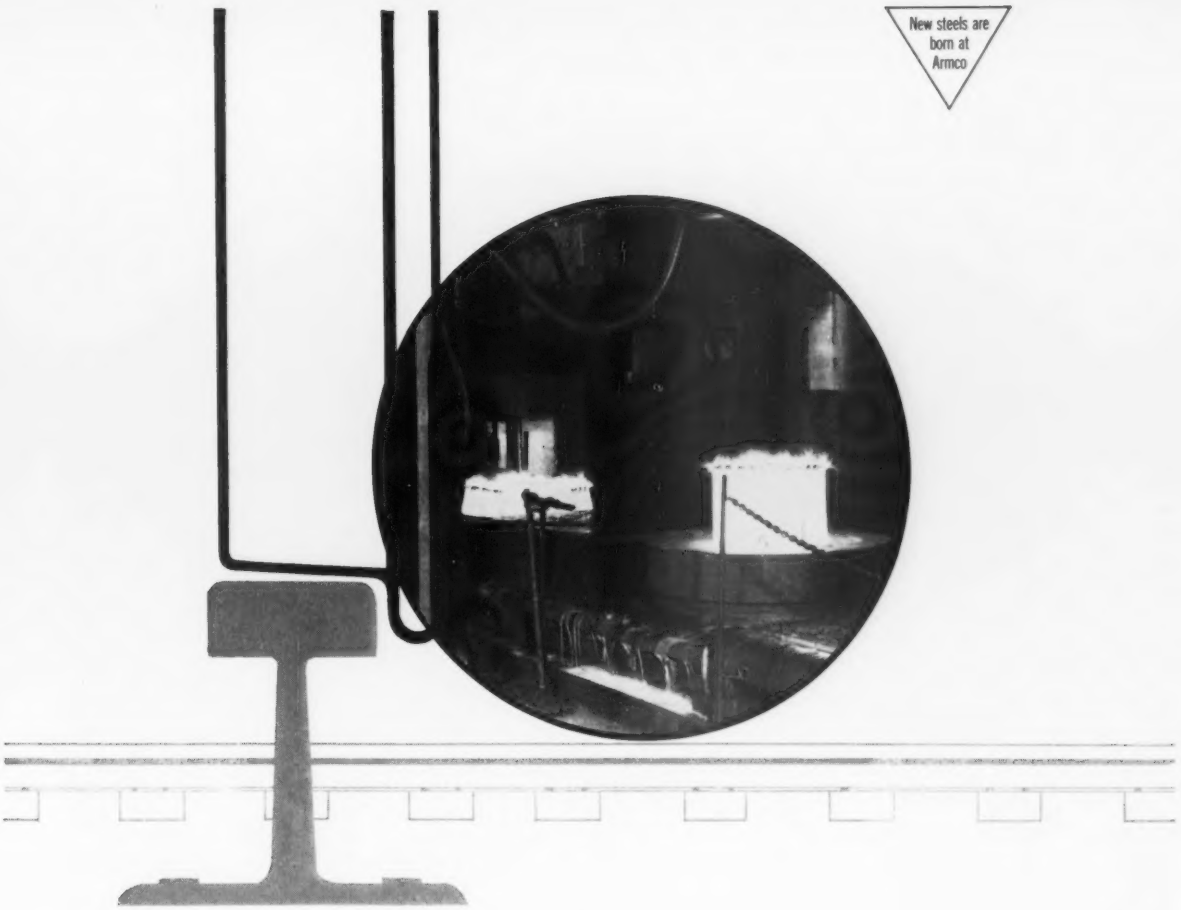
PIONEER IN RAILROAD MOTIVE POWER FOR OVER HALF A CENTURY

LOCOMOTIVE & CAR EQUIPMENT DEPARTMENT

GENERAL ELECTRIC

ERIE, PENNSYLVANIA

New steels are born at Armco



FORGING

For strength, economy, dependability — Steel

gives Armco wheels longer service life

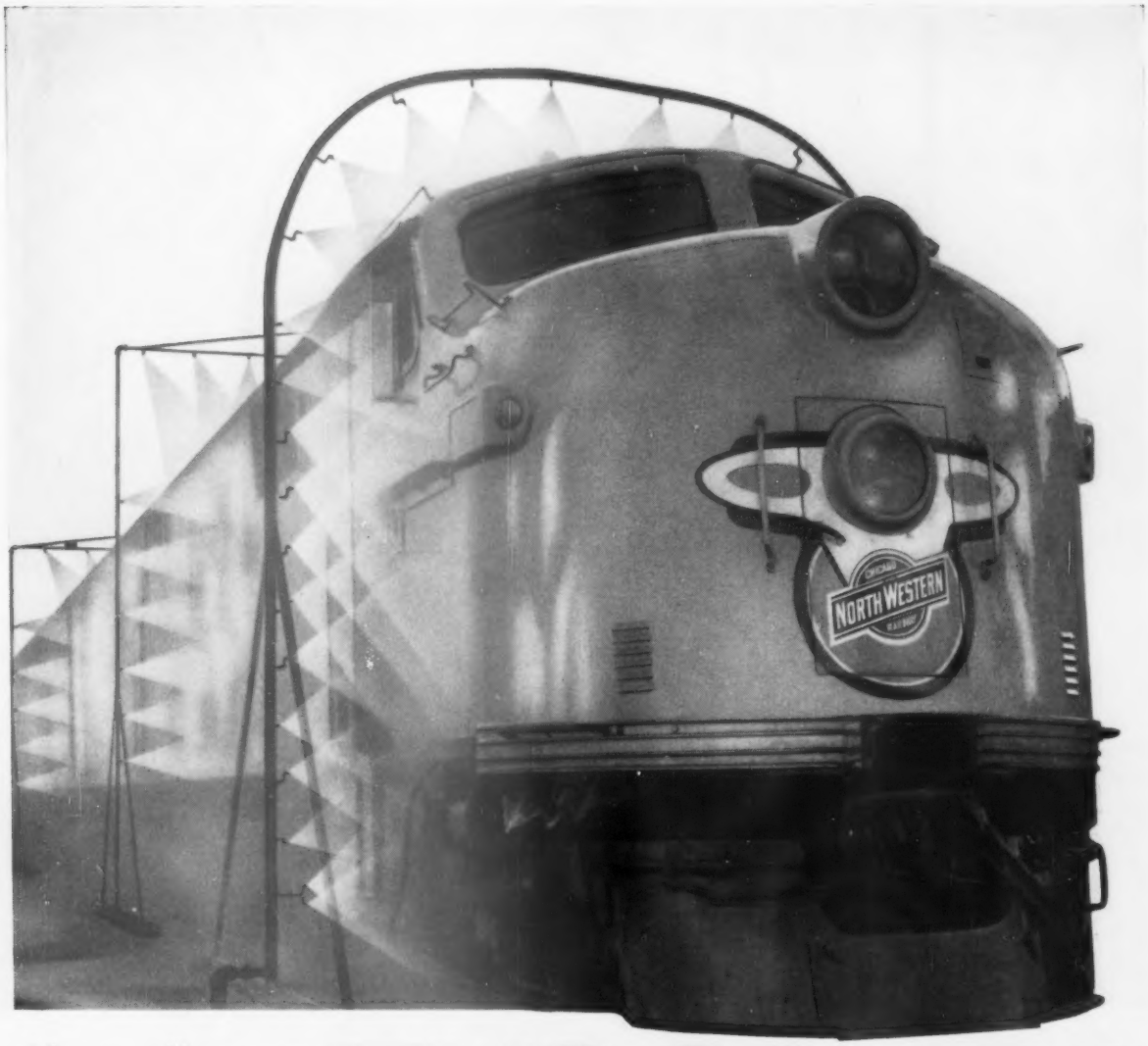
Many tons of pressure squeeze ingot slices into the basic shape of Armco Wrought Steel Wheels. The result is a tough, fine-grained forging. Coarse cast structure is eliminated.

In service, forging means greater resistance to wear, shock and pounding —extra miles of wheel use for every dollar.

Even greater strength and damage resistance is worked into the wheel as it is formed to final size and shape on Armco's powerful new wheel rolling mill.

For complete information, call your nearest Armco Sales Office or write Armco Division, Armco Steel Corporation, 1711 Curtis Street, Middletown, Ohio.

ARMCO Armco Division



they all come CLEAN *with...* TYSOL 196

For oily sticky stains, spots, bug deposits, grease and grime you can't beat the penetrating, powerful, yet gentle finish-preserving action of TYSOL 196! It's an easy-to-use liquid that mixes instantly with hard or soft water. Melts away the soil in minutes!

TYSOL 196 works well in scrubbing machines, and in steam cleaning, too, because it tends *not* to clog coils. Works wonders in diesel engine rooms, cabs, car exteriors, car interiors. Safe for aluminum! Truly, TYSOL 196 is *your* all-purpose, all-around cleaner. Dries with *never* a streak; rinses freely from windows.

Try TYSOL 196 and see! Ask for a free demonstration. No cost or obligation.

A LITTLE TYSOL 196 GOES A LONG WAY...you'll see that especially when you hand brush to achieve that final, sparkling finish you want. TYSOL 196 suds up *fast*...rinses clean as a whistle...and you *save* because it's so concentrated.

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RAILWAY
LOCOMOTIVES AND CARS

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May, 1961—Vol. 135, No. 5

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REPORT FOR MAY

New Electrical Committee

Electrical Section work pertaining to locomotives and rolling stock which, until the end of 1960, was handled by the AAR Electrical Section of the Engineering and Mechanical Divisions is now being taken over by a Mechanical Division Committee on Electrical Equipment—Rolling Stock. The members of the new committee are J. W. Horine (chairman), electrical engineer, Pennsylvania System; J. V. Dobbs (vice-chairman), car lighting and air-conditioning engineer, Santa Fe; R. I. Fort, electrical engineer-equipment, Illinois Central; C. F. Harvey, diesel engineer, Southern; H. J. Betts, chief electrical engineer, Canadian National; D. F. Dunsmore, electrical engineer-system, Chesapeake & Ohio; R. H. Russell, electrical engineer, Great Northern; T. G. Isel, engineer of car equipment and standards, Pullman Co.

Land Transportation Committee Automation Conference

The Railroad Computer and Automation Conference of the AIEE Land Transportation Committee, now scheduled for June 6-7, will be held at the Cleveland Engineering Society Building, Cleveland, Ohio. The program for the technical sessions on Tuesday, June 6 is as follows:

New York City Transit Authority Automated Trains—R. G. Welch, division engineer, NYCTA.

Opportunities for Computers in Land Transportation—R. S. Gillette.

Experience of the French National Railroads in the Field of Remote Controlled Train Operations—J. C. Blumstein, French National Railroads.

Automation of Mail Handling in Railroad Terminals—G. H. Hines and E. H. Abbe, General Electric Co.

Recent Developments in the Operation of Unmanned Locomotives and Trains—L. R. Allison, Union Switch & Signal Co.

Heuristic Train Dispatching—by J. L. Gable.

On Thursday, June 7, inspection trips will be made to the Chesapeake & Ohio Computer Center and the Cleveland Rapid Transit System.

65% of Freight Cars Have Lubricators

Journal lubricators were installed on 65.3% of all freight cars on January 1, 1961. This was up 9.1% over June 30, 1960, figures and included 1,206,096, or 65.4%, of the railroad owned cars and 176,825, or 64.9% of the privately owned cars.

AAR hot-box figures show 6,181 cars set off between terminals in January 1961, giving 378,508 miles per hot box. Pad-equipped cars, now about two-thirds of total ownership, had only 37.2% of reported hot boxes.

In January 1960, hot-box mileage was 324,954 and pad-equipped cars, then just under half of the total ownership, had 28.2% of the hot boxes.

ICC Rejects HD Tank Design

The new HD tank car of the Union Tank Car Co. (RL&C, June 1960, p 40) has failed again to get ICC clearance. Reporting on further hearing in No. 32258 (RL&C, Nov. 1960, p 8), the Commission's Division 3 has denied Union's petition for approval of the new design which embodies several innovations, including the elimination of running boards.

(Turn to page 36)

TIME SAVING IDEAS FOR MAY

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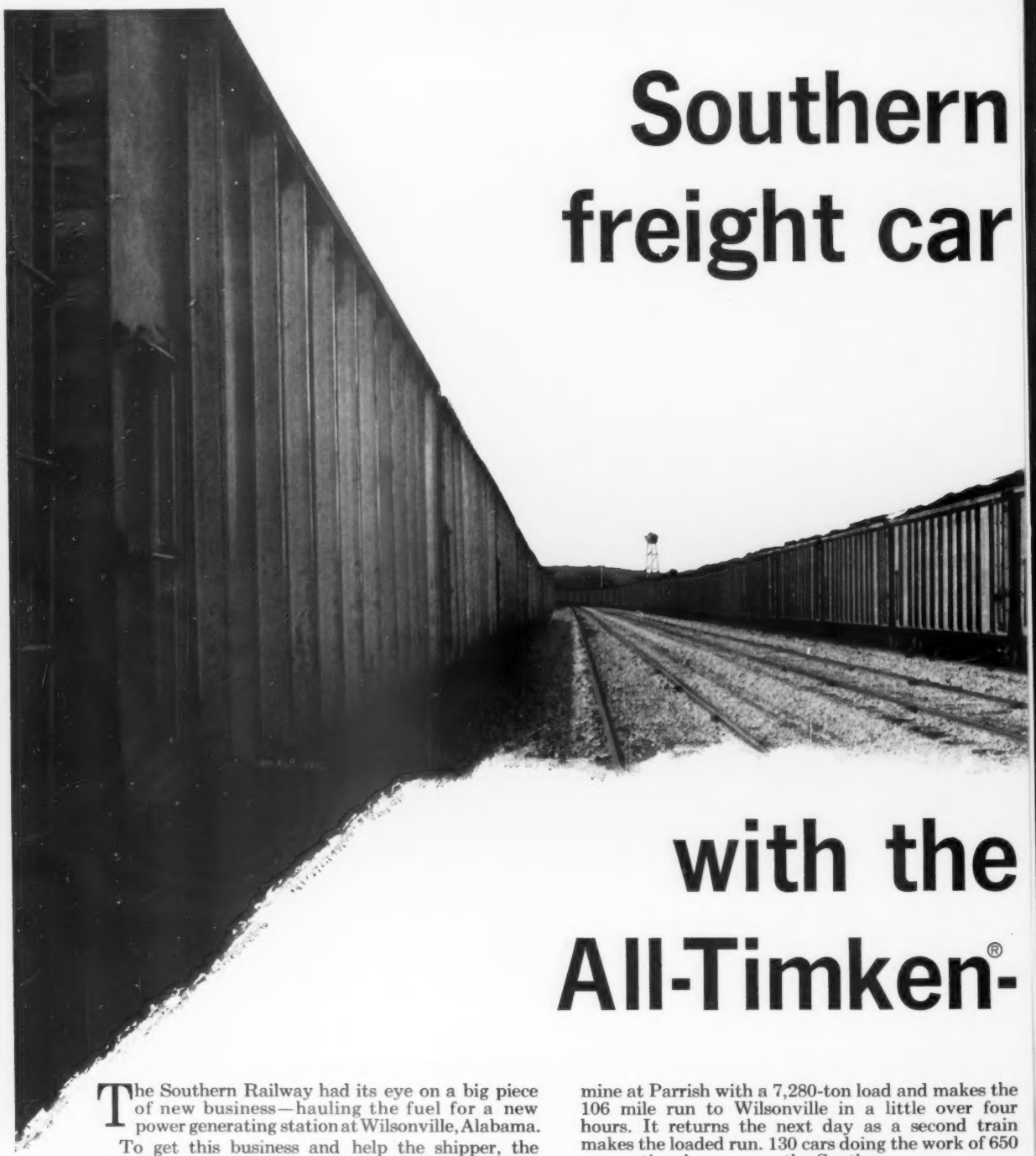


Southern freight car with the All-Timken®-

The Southern Railway had its eye on a big piece of new business—hauling the fuel for a new power generating station at Wilsonville, Alabama.

To get this business and help the shipper, the Southern showed once again that it had the facilities and the imagination to do the job. It started with a new kind of car—giant gondolas with aluminum for everything above the center sill. The result was that by converting tare weight to revenue capacity, the Southern was able to haul 111 tons per car!

These new cars cost $21,000 apiece—not an investment to keep around the repair track. And to help make sure they stay in service, the Southern specified Timken® "AP" tapered roller bearings for the axles—making it an all-Timken bearing train. It cost the railroad less than 5% extra—and helped them get new business and make a profit on it. Each car brings in about $18,000 revenue annually.

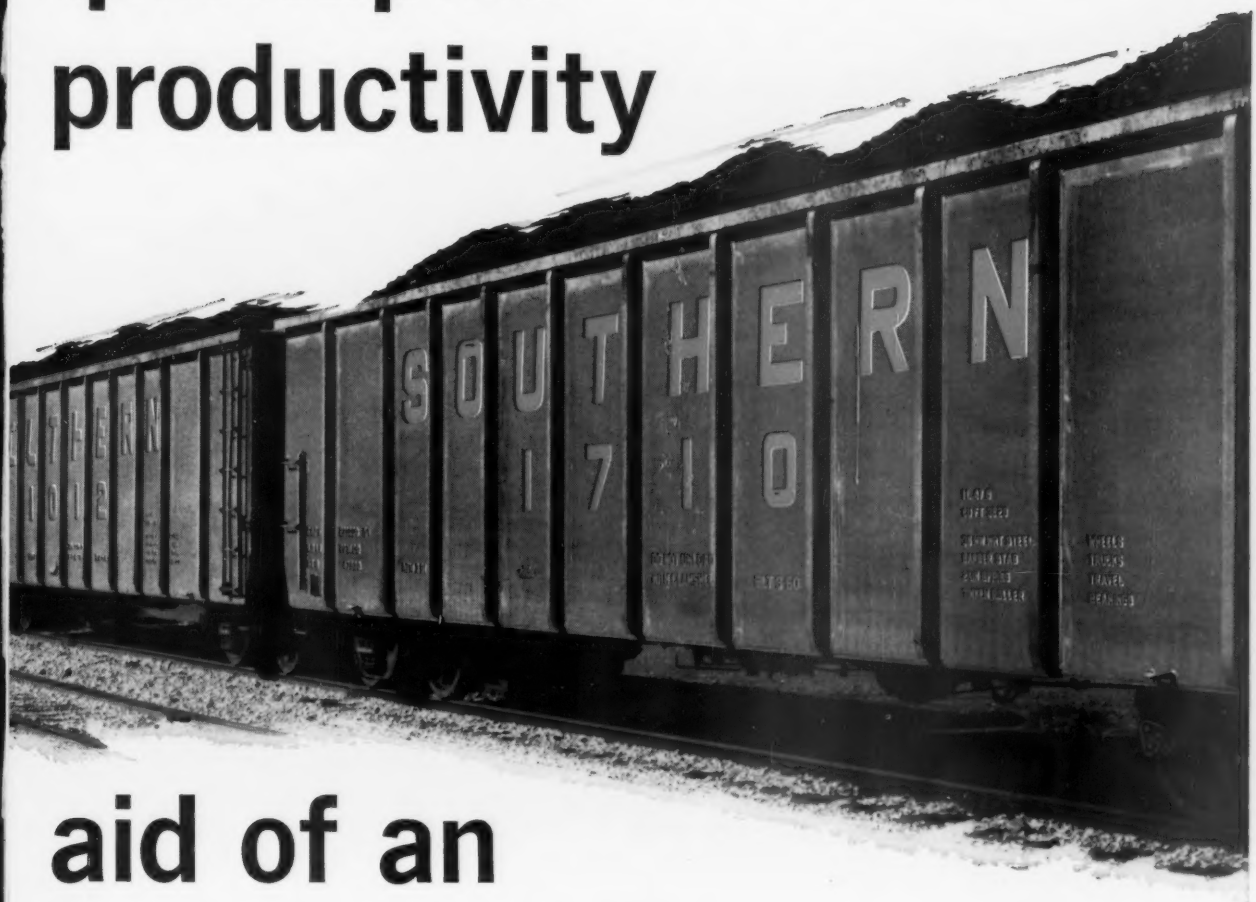
Now, every working day, a 65-car train leaves the mine at Parrish with a 7,280-ton load and makes the 106 mile run to Wilsonville in a little over four hours. It returns the next day as a second train makes the loaded run. 130 cars doing the work of 650 conventional cars, says the Southern.

More and more railroads are turning to Timken heavy-duty bearings to deliver better service to shippers and to cut maintenance and operating costs.

Timken bearings average more than a hundred million car-miles between setouts caused by overheated bearings. They cut terminal time because they require only visual inspection, will roll four years without additional lubricant.

To date 99 railroads and private car owners have over 73,000 cars on Timken "AP" tapered roller bearings in service or on order. Now's the time to make the switch to lower costs and bigger profits. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

quintuples productivity



aid of an Bearing train

AT THE MINE, at Parrish, Alabama, a 65-car Southern train is loaded each day. Intensive utilization of these high cost cars makes the system practical. And Timken bearings help keep the cars in service.

106 MILES AWAY, at Wilsonville, rotary dumpers empty cars in 90 seconds. In about three hours the train is ready for its return trip. This assured availability helps make one-way service profitable.

HEAVY DUTY
TIMKEN®
TAPERED ROLLER BEARINGS

RIGHT--right from the start

BALANCED

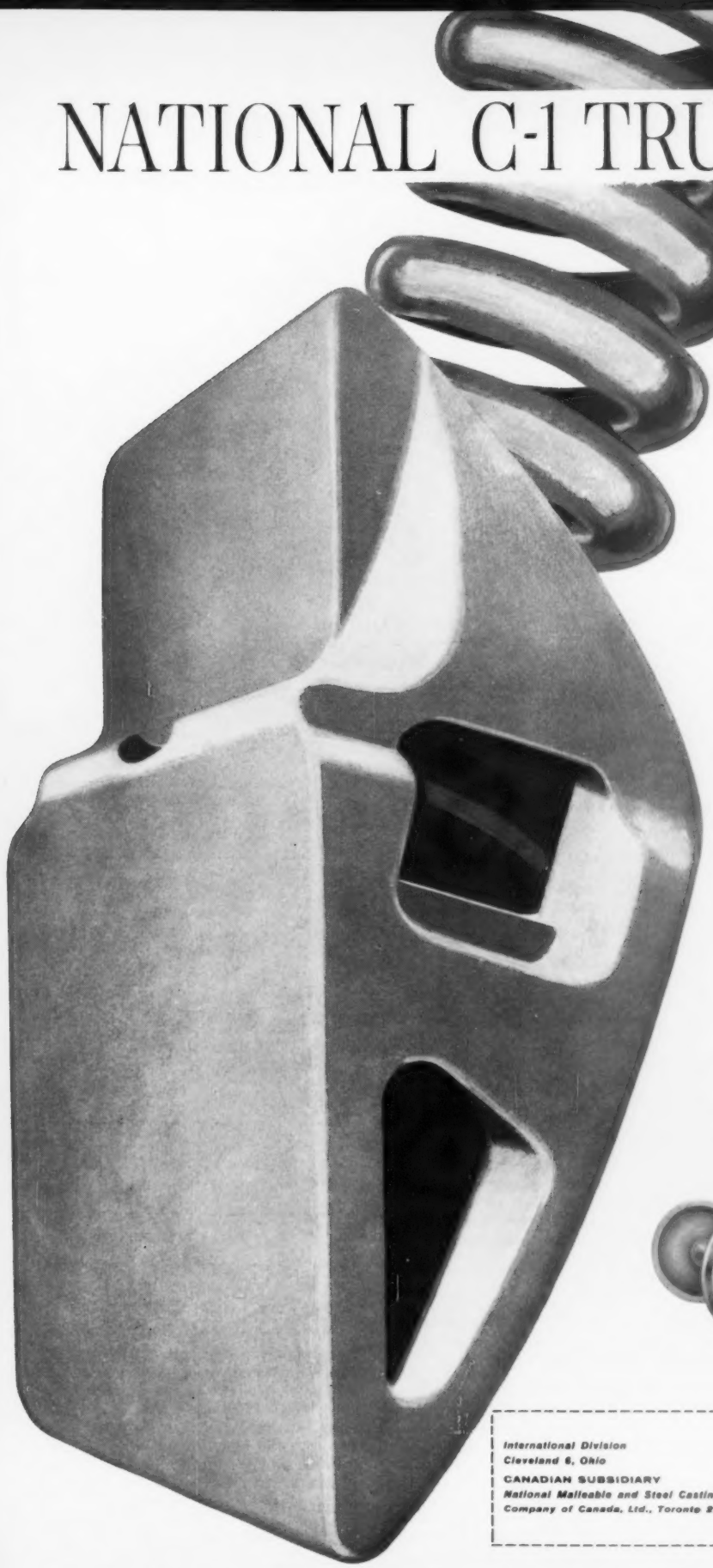
· Design · Metallurgy

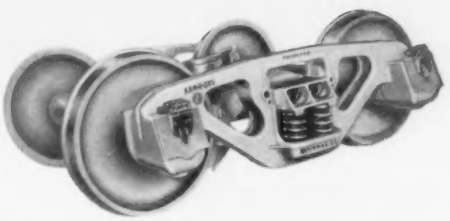
GIVES BETTER

· Operation · Wear

A-1949A

NATIONAL C-1 TRUCKS





Transportation Products Division

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National Malleable and Steel Castings
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COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • JOURNAL BOXES • NATIONAL SPEEDLOADER CONTAINER HANDLING SYSTEM

Electronic Tracer

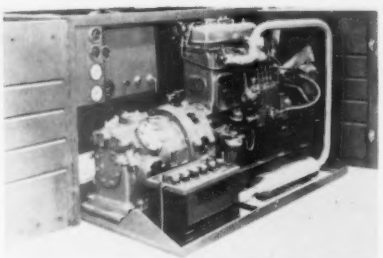
The Aircotron Model J electronic tracer uses templates prepared by conventional drafting methods for cutting work of a non-repetitive type. It has a cutting range speed from 5 to 24 in. and uses 115-volt, 50-cycle, single-phase current at 5 amp. By substituting an appropriate drive motor, higher or lower speeds can be obtained. Stepless cutting speed control and tracing of 90-deg corners without the need of corner radii are provided. The unit can also be used for chain cutting. *Air Reduction Sales Co., a division of Air Reduction Co., Dept. RLC, 150 East 42nd st., New York 17.*

Portable Cleaning Unit

The Mini Dip unit has a parts cleaning capacity of 45 lb. It consists of a 20-gal open-head drum packed with 15 gal of decarbonizing, desludging, devarnishing compound; a basket that fits inside the drum, and the compressed-air-operated, automatically agitated Mini Dip unit that fits over the top of the drum. It is recommended for small shops and for decentralized cleaning in larger ones. *Magnus Chemical Co., Dept. M-124-3, Garwood, N. J.*

Nailable Steel Floor

The Tri-Rib nailable steel floor with 3-in. reinforced rib spacing was developed to provide maximum floor support for fork lift concentrated wheel loads. It can be welded in place from within the car and features more nailing grooves, lapped alternate reinforcing ribs and new rib filler material. Standard 2-ft panels weigh 260 lb. *Transportation Specialties Co., 80 East Jackson Blvd., Chicago 4.*



Refrigeration-Heating System

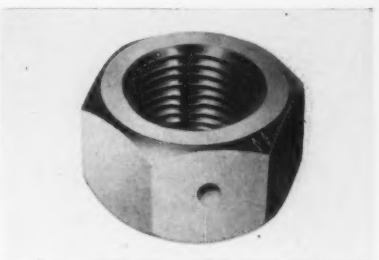
The Worthington TDU-800 refrigeration system is applicable for use on highway and piggyback trailers. When installed, it is said to weigh 300 lb less than other competitive systems of equivalent capacity. It takes up 50% less loading space. It consists of a diesel-engine-driven condenser unit and evaporator unit designed to maintain temperatures from minus 10 to 75 deg. F. The condensing unit weighs 1,050 lb and includes a 4-cyl Mercedes-Benz engine and a 5-cyl, 7½-ton aluminum compressor mounted in a tray on slides under the trailer for easy removal when maintenance is needed. The vertical air-flow evaporator unit requires 13 in. loading space and weighs 350 lb. It is designed for floor mounting and is protected from the lading by a full bulkhead. Two fans with separate 12-volt d-c motors operate at constant speed to provide uniform air circulation. The temperature control unit is mounted on the front of the trailer. Automatic defrost controls are provided. *Worthington Corp., Dept. RLC, Harrison, N. J.*

Tank-Car Paint

Urethane paint—a mixture of modifying resin, pigment, solvent, and urethane prepolymer—applied to tank cars of the Allied Chemical Co., is said to have confirmed the resistance of urethane coatings to corrosive chemicals, abrasion, and weathering. About 16 gal were needed to coat each tank car. Thickness averaged 5 to 6 mils, and maximum coverage was 750 sq ft per gal per mil. It was applied with a spray gun, using 10 to 15 psi fluid pressure based on a 50-ft length of ½-in. inside diameter hose. *Spencer Kellogg & Sons, Dept. RLC, P.O. Box 989, Buffalo 5, N.Y.*

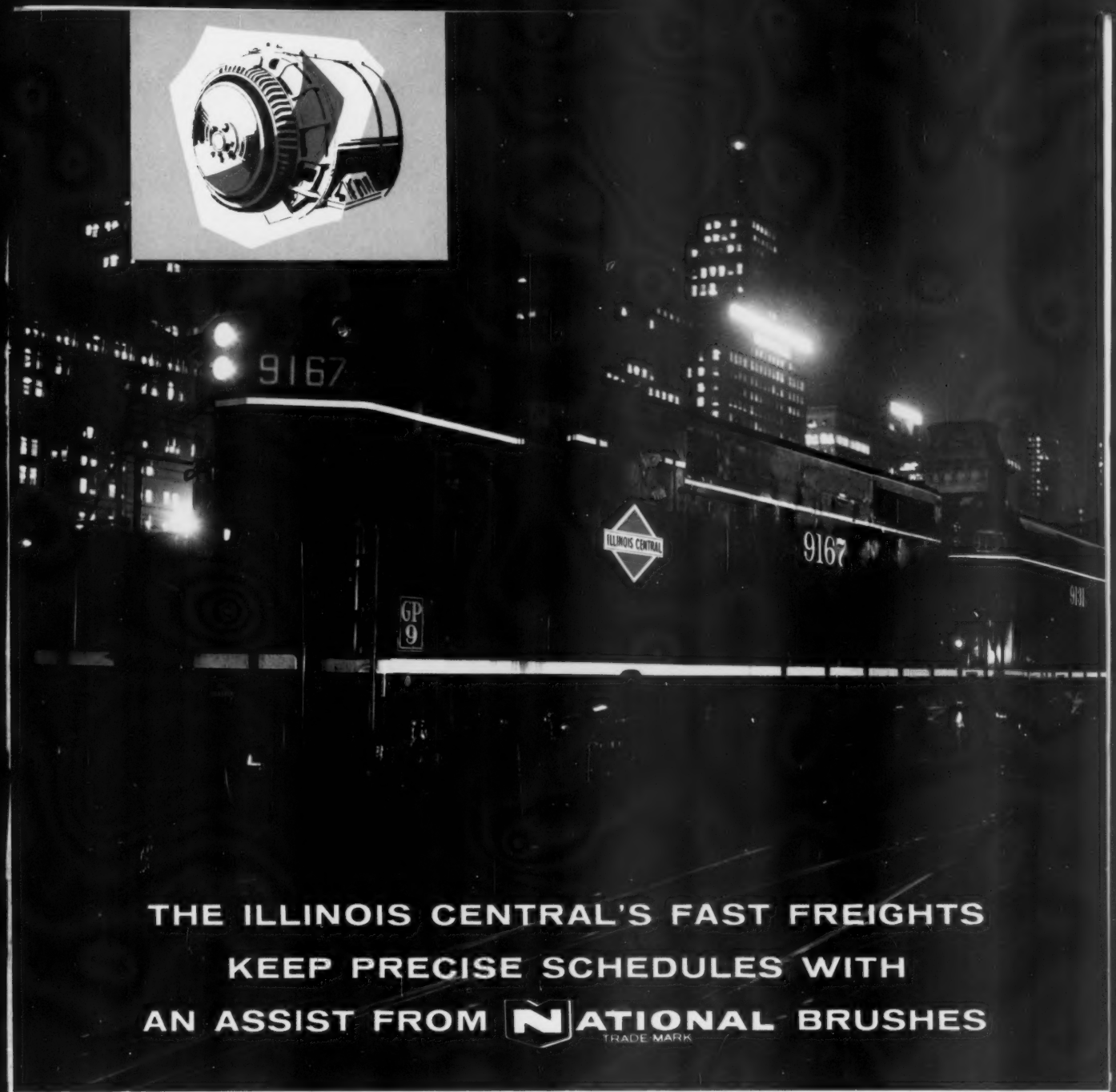
Dipping Basket Container

Jaldip consists of an all-steel container and dip strainer basket for cleaning or applying protective coatings to tools, machine parts, etc. It is available in 1½- and 6-gal sizes, 8⅜ and 11¼ in. in diameter, respectively. The removable container head is either a lug cover or a lever ring closure. The strainer basket has hooks for attaching it to the container during drainage and legs to keep it clear of sediment on the container bottom. *Jones & Laughlin Steel Corp., Dept. RLC, 3 Gateway Center, Pittsburgh 30, Pa.*



Two-Way Lock Nut

Double chamfer allows the reusable Two-Way lock nut to be applied automatically from either side, and eliminates need for selective devices. The locking device is in the body of the nut which is ovalized to give 180 deg spring. The threads are deflected at point of lock so that the nut can be locked in any position. The nut can be had in sizes No. 5 through 1¼ in.—American Standard finished dimensions. *MacLean-Fogg Lock Nut Co., Dept. RLC, 5535 N. Wolcott ave., Chicago 40.*



THE ILLINOIS CENTRAL'S FAST FREIGHTS KEEP PRECISE SCHEDULES WITH AN ASSIST FROM NATIONAL BRUSHES

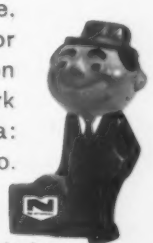
TRADE-MARK

Modern railroads like the Illinois Central are using fast freights to bring improved service to their customers. Programs of this nature require trouble-free motive power with minimum lost-time for maintenance.

All the components in the locomotive, no matter how large or small, must offer rugged, dependable service to assure that these complex schedules will be met.

"National" generator brushes—small but vital components—offer proved commutation and life, and operate with the reliability so necessary for today's progressive railroad service.

National Carbon Company offers a positive carbon brush service program to help America's railroads provide improved freight delivery. To realize this assistance, just call your "National" Brush Man, or write National Carbon Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N.Y. In Canada: Union Carbide Canada Limited, Toronto.



Contact your "National" Brush Man

UNION CARBIDE

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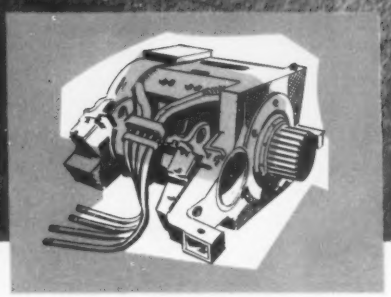
NATIONAL CARBON COMPANY

THE SOUTHERN PACIFIC'S FAST FREIGHTS MEET EXACTING SCHEDULES WITH AN ASSIST FROM NATIONAL BRUSHES

TRADE-MARK



Because of the Southern Pacific's fast-freight service, industrial customers served by this 14,900-mile rail network are permitted to maintain smooth production schedules with a minimum of inventory.

The close scheduling involved requires rugged and reliable service from fast freight diesel locomotives.

"National" traction motor brushes—wherever used on the Southern Pacific's 2,000 diesels—offer dependable commutation and life . . . and help keep motive power in service by reducing maintenance.

To meet today's constantly changing and more difficult electrical conditions, National Carbon Company contributes to improved railroading through a positive carbon brush service program. To realize this assistance, just call your "National" Brush Man or write National Carbon Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N.Y. In Canada: Union Carbide Canada Limited, Toronto.

Contact your "National" Brush Man

UNION CARBIDE

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EDITORIALS

Let George Do It

"Why don't the railroads carry on research like other industries?" is a question frequently asked. It is then usually implied that the railroad's failure to do more research is a major cause for their current competitive condition and financial state. While the answer to the first part of this question is that they do conduct individual and cooperative research, the "like other industries" portion could, when examined closely, be found to be but one more symptom of what is really wrong with railroading.

Look at the commercial aviation industry. Over the past three years the world's airlines have put into service radical new equipment which has completely changed the tempo and scope of their operations. Research has certainly played a big role in the jet revolution. Who did that job? What are the airlines now doing about future technology? Not too much apparently, but there's no reason for them to be concerned.

"Shortly after 1970," one newspaper recently reported, "you will probably be able to fly from New York to Los Angeles in 1 hr 16 min . . . The prospect was held out by Najeeb Halaby, Federal Aviation Agency Administrator, who told engineers and industrialists the government was willing—in fact, eager—to invest $12,000,000 to determine the feasibility of a supersonic jet air liner capable of such a schedule.

"Should Congress grant the funds, a committee headed by Mr. Halaby and representing the National Aeronautics and Space Administration and the Defense Department, as well as the FAA, would make the study. Following its feasibility study, the government would bring together aircraft manufacturers, airline operators, the military, and civilian government agencies to develop the plane. It would, Mr. Halaby said, be the largest single project ever undertaken in the aviation industry. 'President Kennedy has asked me to spearhead the government's initiative in this area,' Mr. Halaby stated."

Mr. Halaby then explained that the supersonic airliners probably will have to be flown for a year or more in cargo operation before they could be considered safe enough for passengers. "The Boeing 707 subsonic airliner has been able to jump right into passenger operations only because thousands of hours of experience had been built up with the military version. Most other commercial jets now flying also were able to skip any interim cargo operations, having also benefitted from the experience of the military 707."

"Like other industries" when applied to commerical aviation seems to mean letting the government be the "George" who does the job. It means letting the government write off the $12,000,000 feasibility study if the project should prove to be unfeasible. With enthusiastic government backing and taxpayer's money, there would seem to be little possibility of such failure. Instead, it would appear that commercial aviation will probably get, already neatly packaged, the tools for its next "great leap forward."

Advancements in technology don't come so easily and cheaply in railroading. Railroads don't get taxpayers to foot their research bill.

Feast-or-Famine Buying

We are not very smart. Otherwise, the railroads and the car builders would have solved long ago the "feast-or-famine" cycle of freight-car buying.

For some time we have been in the "famine" phase of the cycle. The backlog of cars on order on April 1, 1961, was 15,801 compared with 42,131 cars on April 1, 1960. Only 4,278 of the 15,801 cars on order were backlog orders of the car builders; the remaining 11,523 cars were on order from the railroads' own shops.

The "feast-or-famine" cycle costs the railroads money because plant idleness incurs costs that must be included in the price of cars. And when the "feast" phase starts, the railroads then want the cars on a hurry-up basis which always involves added costs.

Smoothing out these violent fluctuations in car orders is a worthwhile project. We do not have the answer to the problem but perhaps special inducements could be offered when signs point to a deterioration in car orders. Why should we wait until a situation becomes critical, like the commuter problem, before taking corrective action?

Mechanical Meetings

The industry is aware that the AAR Mechanical Division has cancelled its regular June, 1961 annual meeting as part of AAR economy measures. Mechanical Division committee reports will be presented before a limited, closed session of the Division's General Committee to which committee chairmen and a relatively few mechanical department officers are to be invited.

So that all those interested can know what actions are taken, Railway Locomotives and Cars will give greater coverage than usual in its July issue to a report of the important and essential work of the Mechanical Division.

In September the Coordinated Associations will hold their regular meetings along with what promise to be exceptionally fine track and hotel exhibits of the Allied Railway Supply Association. The Air Brake, Car Department Officers, Locomotive Maintenance Officers, and the Railway Fuel and Operating Officers Associations have already set up outstanding programs for these September 10-13 meetings.

We regret the loss of personal contact between the Mechanical Division's membership but we believe our efforts will help to fill the void caused by the cancellation of the regular AAR meeting. We also believe that the September meetings will be a wonderful opportunity for all mechanical department officers to get together and exchange worthwhile ideas and information.

SIGNS OF THE TIMES ON HORSESHOE CURVE . . . two trains of strictly modern vintage sweep westward 'round the Pennsylvania's storied bend above Altoona. More than half of all piggyback flat cars bear the now-familiar double "T" of Trailer Train.

QUALITY CONTROL ON A TTX CAR . . . weld inspection is just one of many phases of quality-control in Bethlehem's freight-carbuilding program. Weld-prober has just cut small weld specimen (foreground) from buttweld in center sill cover plate, with which inspector can check weld quality.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

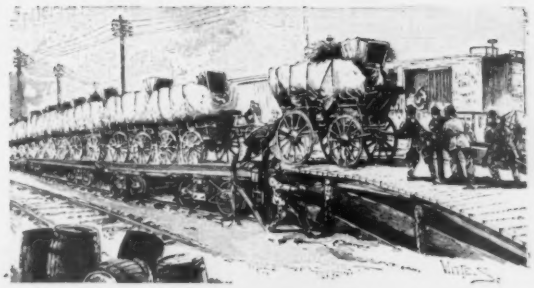
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Trailer Train's 5 years have been big years of piggyback progress

IN 1884

The piggyback freight idea goes well back into railroad history. In 1884, an eastern railroad wheeled farmers' produce-laden wagons onto flat cars for shipment into the city. Then, as now, the wagons were end-loaded onto strings of cars by means of ramps which were crude versions of those in use today.



IN 1954

Modern piggybacking started to roll when Bethlehem built the first of the king-size flat cars: 200 for the Pennsylvania, 50 for the Erie. Designed to haul two 35-ft trailers each, these cars are 75 ft long, equipped with roller-bearing axles.

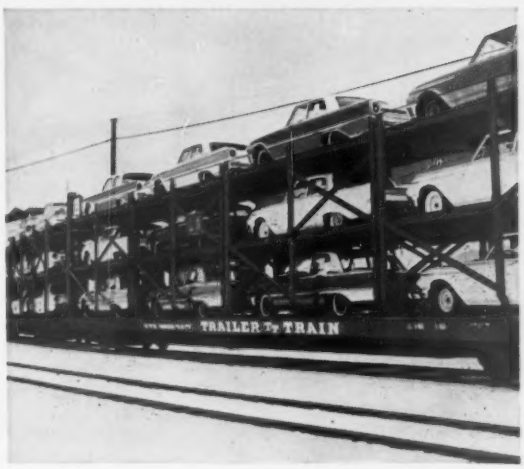
IN 1956

Trailer Train (TTX) was born. Trailer-on-flat-car service was catching on fast, and Trailer Train swiftly moved with the tide. In five dynamic years, TTX grew to its present position of outstanding leadership.

TODAY

TTX continues to expand its fleet. Just recently it took delivery of the final shipment of an order for 125 Bethlehem-built 85-ft cars equipped as shown to accommodate the fast-growing transport of new autos by rail. Long strings of cars like these, traveling on passenger train schedules, are playing an important part in bringing this traffic back to the railroads. One expert predicts that in five years or so piggyback freight will rush from coast to coast in 48 hours.

Bethlehem congratulates Trailer Train on its momentous fifth birthday, and looks ahead to many more such anniversaries to come.



BETHLEHEM STEEL

for Strength
. . . Economy
. . . Versatility

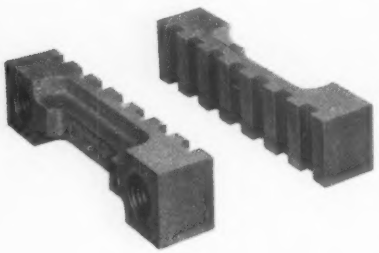
Steel

STABILIZED JOURNALS—

Now MAGNUS offers you three low-cost ways to get

BETTER BEARING PERFORMANCE

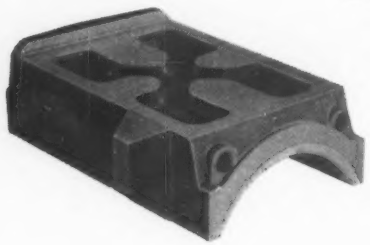
1. MAGNUS R-S JOURNAL STOPS



Provide maximum stabilization of entire journal box assembly—increases miles per hot box ten times

Bolted to the inside of the box, on both sides of the journal, Magnus R-S Journal Stops positively prevent excessive displacement of bearing, wedge or lubricator pad, even under severe humping, braking or road impacts. By stabilizing the entire journal bearing assembly they eliminate the major causes of bearing failures—increase miles per hot box *ten times;* miles per cut journal, *fifteen times!* In short, they cut maintenance and operating costs all along the line—double bearing and dust guard life, reduce wheel flange wear, extend the maximum safe period between repacks.

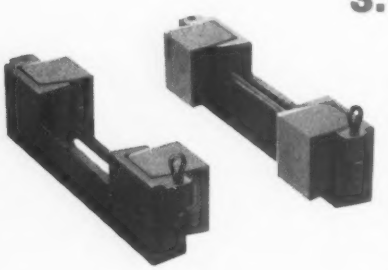
2. MAGNUS FLAT-BACK SOLID BEARINGS



Wider, non-tilting design limits bearing displacement—provides effective stabilization at lower cost

The Magnus flat-back bearing design provides the most economical means of stabilizing the journal box assembly, and has proved highly effective for many types of service. Its greater width, increased angle of journal contact and full-area contact with the flat wedge inherently limit the fore-and-aft movement of the journal within the box under road shocks and switching impacts. This restriction of movement protects the dust-guard, reduces loss of oil through enlarged dust-guard openings and tends to prevent spread linings in the bearing.

3. MAGSTOPS



Offer the inherent advantages of R-S Journal Stops in a low-cost, rugged, fabricated design

Here's a new approach to the problem of journal box stabilization—a low-cost fabricated journal stop with forged steel frames and renewable bronze inserts that hold the journal in the center of the box even under the most severe car impacts. The frames are welded to the inside of the journal box and need never again be removed. Wear occurs only on the brass inserts, which are easily and inexpensively replaced during wheel changes, without any special tools.

The next big step toward better bearing performance will be the adoption of effective means of stabilizing the journal assembly—for this is the most economical way to reduce hot boxes. Magnus, the pioneer in journal stabilization, now offers you *three ways* to achieve this result at low cost. All have been approved by the AAR for test installations in interchange service. Ask your Magnus representative to discuss with you the most effective solution to this problem. Or write to Magnus Metal Corporation, 111 Broadway, New York 4, or 80 E. Jackson Blvd., Chicago.

MAGNUS METAL CORPORATION

Subsidiary of

NATIONAL LEAD COMPANY

Milwaukee Improves Truck Repair

Shop has been arranged and tooled to produce overhauled trucks for all road's locomotives

Improvements recently completed by the Milwaukee have produced a diesel locomotive truck repair system at the Milwaukee, Wis., shop which is designed for an output of four trucks rebuilt or given running repairs each day. Traction motor repairs are also geared to this output (RL&C, Jan. 1960, p 41).

The Milwaukee shops its General Motors diesel road locomotives on a mileage basis for resealing. For passenger units this is done every two years (480,000 miles) and for freight units every three years (360,000 miles), based on an average of 20,000 and 10,000 miles per unit per month, respectively. Trucks are shopped after 240,000 miles and traction motors at 300,000 miles.

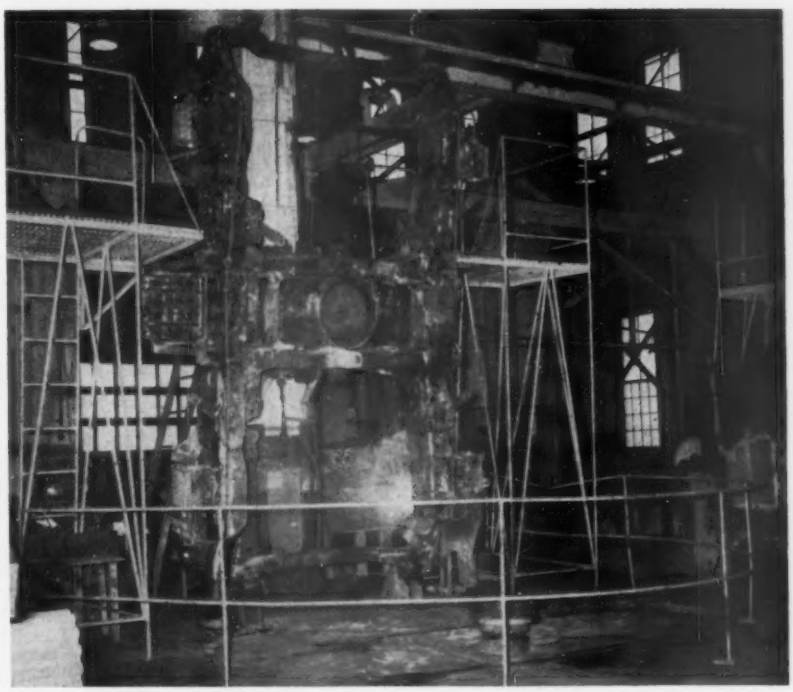
New equipment and advanced repair techniques are expected to improve the quality of truck repairs. By restoring trucks to new truck specifications, the road expects increased life for roller bearings and wheels.

The shop has a 17-man work force and 19 work stations. Electric-hoist jib cranes are located to serve pairs of work stations, with the exception of the running repair stations. Tool and parts racks adjacent to rebuild stations are completely equipped for assembly operations. An overhead 20-ton crane, running the length of the shop, simplifies handling of traction motors, wheels, truck frames, and complete trucks. Running repair trucks are generally placed wheels-down on working height elevated track stations for removal of traction motors and minor repairs. Trucks are inverted at the stations involved in heavy rebuilding.

Diesel units requiring truck changes come into the adjacent engine-house to a drop pit. Trucks for repair then move directly into the truck shop on a track leading from the drop pit. Inspection is made by the truck foreman to determine necessary repairs. Trucks requiring running repairs are placed at three special stations. Those scheduled for rebuild are placed upside down on individual dollies and spotted at any of the four stripping stations. Wheels, traction motors, journal boxes, and brake pistons are then removed in preparation for truck cleaning. Four trucks can be stripped by two men in one day.

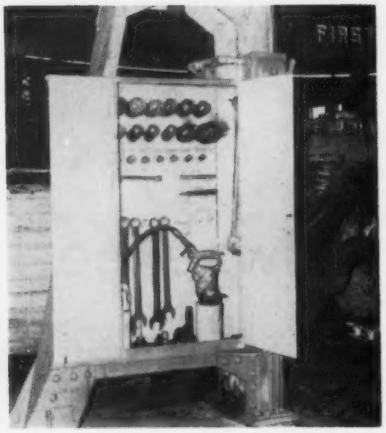
Each truck frame is placed in the cleaning vat for 4 hr. In the bottom of the vat are three suction pipes of different lengths. Each pipe ends in a rectangular strainer. The cleaning solution is agitated by compressed air from perforated pipes on each side of the bottom of the vat. For more effective cleaning and extended cleaning solution life, a Henry self-cleaning liquid filtering machine is installed on the vat. Pumps connected to each suction pipe move contaminated cleaning solution to the inlet side of the filtering machine where a series of diffusers slow the liquid so floating dirt, oil, and grease rise to the surface in the skimming compartment.

The solution then flows over overflow weirs into the settling compart-



Down-hand welding of pedestal jaws can be done on two levels at the tip-up stations. Pivoting device to reposition the truck frame fits in center casting.

Separate skids at stripping stations hold the wheel and traction-motor assemblies and the brake pistons. Truck frames go to the cleaning vat following disassembly.



Tool cupboard has complete set of hand and power tools for the truck-stripping operations.

Container holding eight traction-motor gear cases is removed from the special cleaning tank.

ment where particles down to 50 micron size settle out. Conveyors below the skimmer and overflow weirs continuously carry settlings out of the unit. The solution then flows through the overflow troughs into the clean solution compartment and back to the cleaning vat by gravity. The truck cleaning vat is expected to require cleaning only annually. In the past, it was necessary to shut the vat down a day every three months while a clamshell removed two to three tons of sediment accumulation.

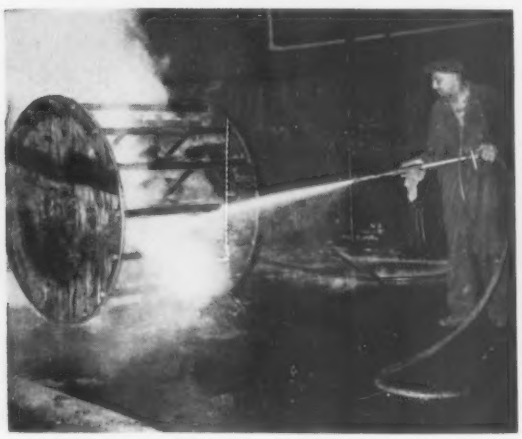
Typical Cycle

A typical cleaning cycle on four-wheel EMD trucks starts on Monday morning at 10 a.m. when the first truck frame is placed in the vat for the 4-hr cleaning cycle. By the next morning, the four cleaned frames will have been placed upside down at the four rebuild stations.

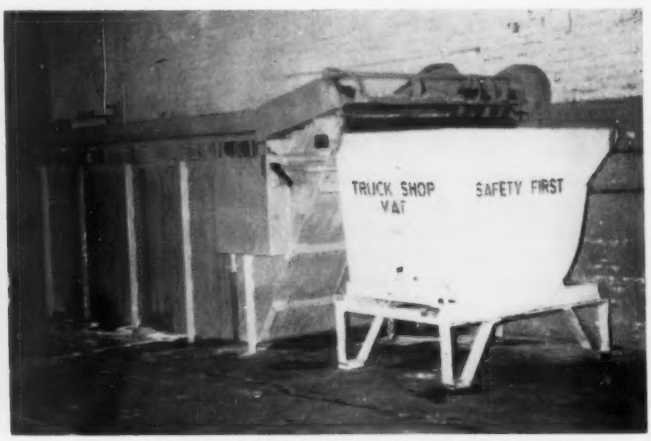
Completion of stripping of the cleaned truck frames involves removal of the pedestal liners and coil springs the first day, and the brake rigging on the second. Truck sets of brake rigging are placed in skids and moved to the repair area where parts are built up by welding and where new bushings are applied.

An eight-compartment cylindrical container is used for the cleaning of truck sets of traction-motor gear cases. The elevated cleaning tank is provided with rollers to rotate the container through the hot cleaning solution.

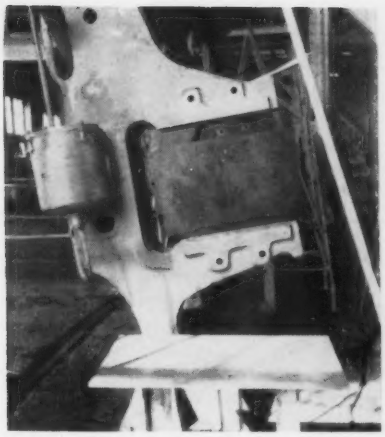
Truck frames with worn pedestal jaws are moved to two tip-up stations in the east end of the shop so down-hand welding can be done. Each station is equipped with a 6-ton crane and turntable so one man can position and reverse the frame. All rebuilt trucks have the pedestal jaws restored to original dimensions. The bottom four jaws on one frame are welded initially. While the frame is being reversed, the welder moves to the second frame where he welds the bottom jaws before he returns to the first frame which



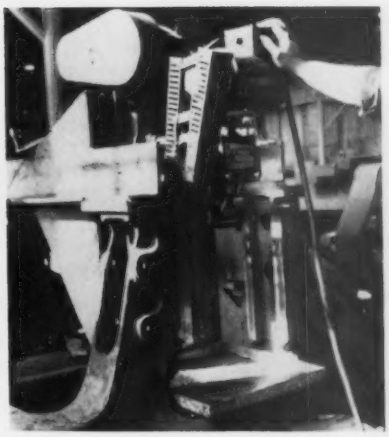
Gear cases get thorough rinsing after removal from vat to remove all residue and cleaning solution.



Filtering machine is installed behind the cleaning vat shown on front cover. Settlings are continuously discharged into refuse hopper.



Truck frame has been positioned at tip-up station for welding of the lower pedestal jaw.



Truck jaws are milled to new truck dimensions by cutter which moves up and down jaw face.

Milled jaw, equivalent to those on new truck, is ready for the application of new liners.

can then be completed. Platforms at each station permit down-hand welding of the upper jaws. Truck frames were previously welded vertically in an upside down position on the floor. This required 8 hr for two welders on one frame. With the tip-up arrangement, one welder can finish a frame in 8 hr.

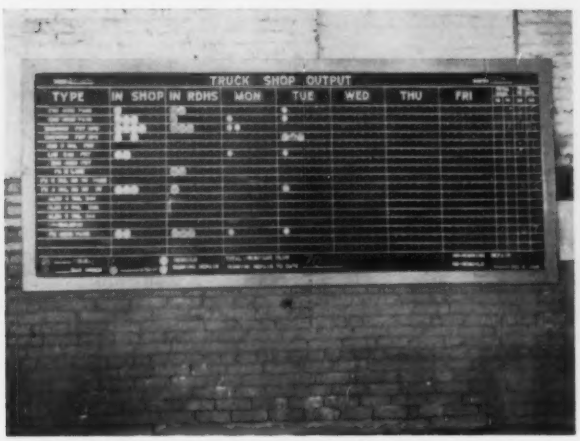
After welding, truck frames are placed upside down at work stations where a Dunmore Versa-Mill is used to face the pedestal jaws. Cuts vary in depth from 0.060 to 0.070 in. An adjustable-speed pulley equipped with a V-slip belt varies cutter speed. Only one face on one side of the jaw is machined with the present cutter. Generally, one roughing cut is taken down the jaw and a finishing cut upwards. A heavier machine with a cutter that will mill one side of the jaw in one operation is expected to replace the present machine in the near future. It takes 8 hr to machine one four-wheel truck frame. The new cutter should cut this milling time in half.

Truck frames are then moved to assembly stations where Magnafluxed bolster hangers are ready for application. The Magnaflux equipment is mounted on a press so that bushing removal, examination for cracks, and rebushing can be done continuously. Traction-motor support lugs are welded. New bushings and pins are applied, brake rigging renewed, and turned, or new wheels and repair motors are mounted.

Locomotive wheel sets are installed in reconditioned traction motors in the area east of the welding tip-up stations (RL&C, June 1960, p 50). The assemblies are stored on portable stands east of No. 1 station and moved to rebuild stations when required for locomotives in the shop.

Racks at rebuild stations produce an orderly arrangement of all necessary parts.

Reconditioned traction motor is ready for application to truck brought in for running repair.

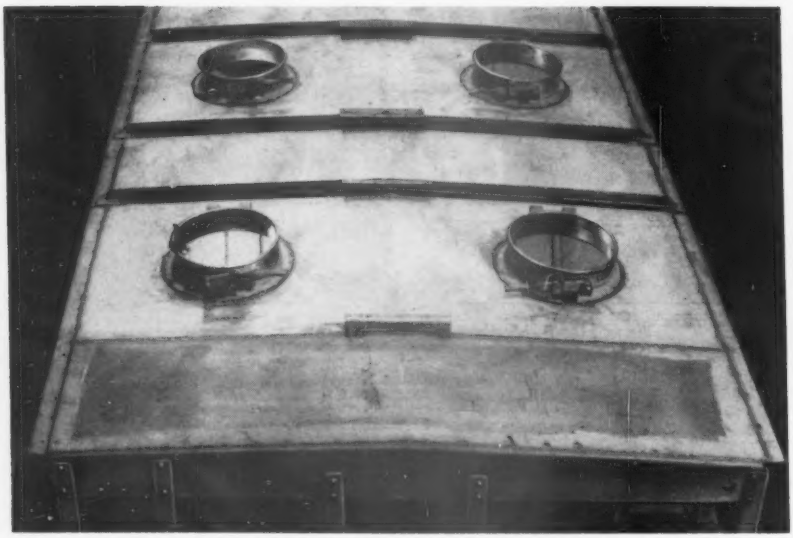


Inventory of trucks in shop, enginehouse, and under repairs is shown by board which also indicates progress of work.

Trucks enter shop at far end. Rebuild stations are in left foreground. The stripping and milling stations are on the right.

Stainless-steel body is used in conjunction with Cor-Ten body structure and Tri-Ten center sill. Car is almost completely welded.

SP Tests Stainless Covered Hopper



Cor-Ten carlines extend over top of stainless roof sheets. Because body interior is all stainless steel, U.S. Steel says cleaning is simplified and plastic linings are unnecessary.

The Southern Pacific is putting into revenue service the first Tenelon stainless-steel covered hopper car recently completed for the United States Steel Corporation by Pullman-Standard. All body components which contact the lading are of USS Tenelon—a stainless steel with design strength about twice that of conventional austenitic stainless steels.

Because of this higher strength, it was possible to use thinner, lighter sheets of Tenelon to fabricate the car's hoppers, floors, side sheets, roof, and hatch covers—all components which come in direct contact with the lading. U.S. Steel says the new car is about 15% lighter, yet equal in strength to conventional covered hopper cars made from structural carbon steel, high-strength steel, or even other grades of stainless steel.

The car is intended to make possible economical shipment of bulk materials. The corrosion resistance of the body will enable the car to carry a range of bulk materials from chemicals to food products without the linings frequently needed in carbon-steel covered hoppers. In addition, U.S. Steel says, the stainless body is especially designed to protect shipments from contamination. Engineers point out that in the car's all-welded Tenelon hoppers there are no areas where particles of one shipment could lodge to contaminate a subsequent shipment of another material. A thorough washing or cleaning between shipments will "make the car kitchen clean and ready for the next load."

The 90-ton car has a capacity of 3,750 cu ft and a light weight of 58,500 lb. The original design called for a light weight of 56,500 lb, but this was subsequently increased intentionally so that it would not be necessary to use empty-load brakes. Weight of a comparable carbon-steel hopper is about 70,000 lb.

For those parts of the new car which do not come in contact with the lading, designers used two USS high-strength, low-alloy steels. USS Tri-Ten was chosen for the center sill because of its strength-to-weight ratio and impact resistance. Cor-Ten is used in the side sills, side posts, and various other structural components in the underframe, roof, and ends of the car.

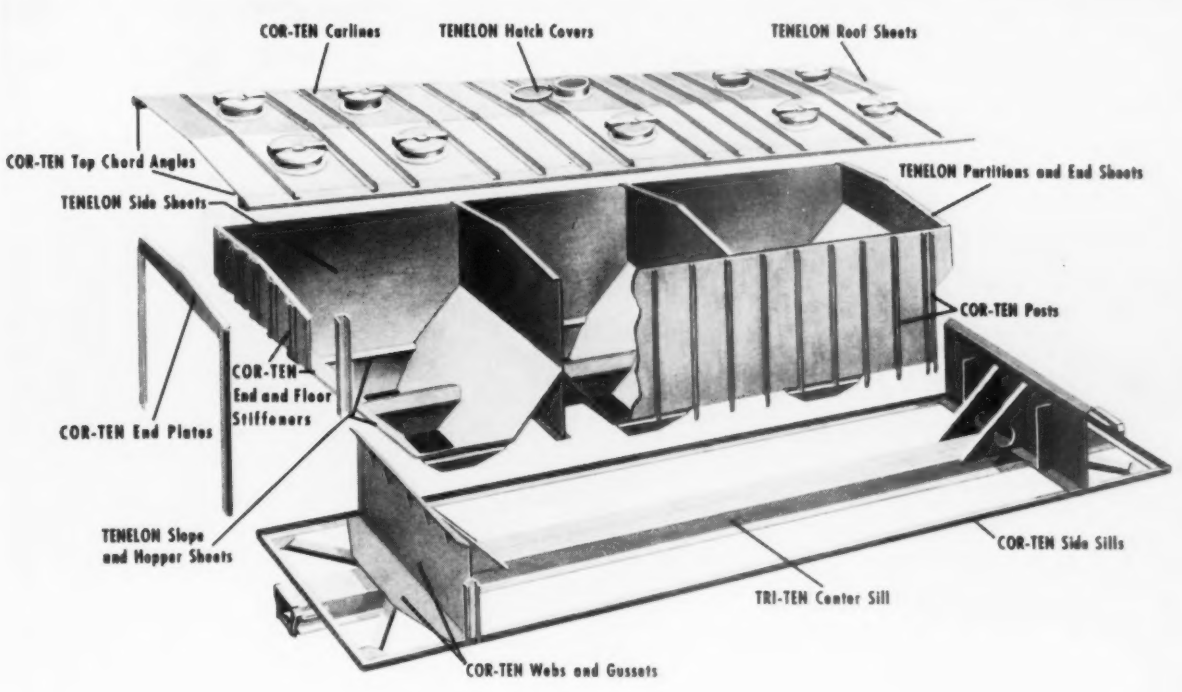
In discussing the car recently completed at the P-S plant in Butler, Pa., USS officers were quick to emphasize that there are no unusual design features—that the car represents the utilization of a new material in a conventional car design. The car is "an effort of U.S. Steel to promote its material on behalf of all carbuilders," it was explained. The material should provide railroads with "a material for carbuilding that is within the limits of what they can economically justify." U.S. Steel is not entering the carbuilding business.

Tenelon is a manganese-chromium-nitrogen stainless with no nickel and very low carbon content. It has a high yield strength in the annealed condition. Its yield strength—almost twice that of the 18-8 grades of stainless steel—is 70,000 psi. Ductility is close to that of familiar stainless grades. Tenelon, according to U.S. Steel, has mechanical advantages and properties that lend themselves to solving engineering problems involving strength and corrosion resistance.

The steel company officers anticipate widespread use of Tenelon in future car construction. Among other things, they say, the new stainless alloy provides an answer to the competition with aluminum. Several covered hoppers with aluminum bodies have been placed in service in recent months.

The car's inside length is 41 ft ¾ in., and inside width is 9 ft. 11 in. Outside, the car is 47 ft ¾ in. over strikers and 14 ft 6 in. over running boards. The trucks are fitted with roller bearings and 36-in. wrought-steel wheels. A coded paint scheme has been used in the prototype car to designate the structural alloys. Body sheets of production cars would not require paint.

Initial cost of materials in the car compares favorably with that paid for conventional construction. First costs will be virtually the last cost, according to USS spokesmen. The car, they say, "should last indefinitely." Following the SP operation, the prototype covered hopper will be available for service tests by other railroads and shippers.



Steels utilized in construction of new covered hopper were chosen because of special characteristics which solved various design problems.

Electro-Motive announces
new facilities for complete

CRANKSHAFT REMANUFACTURING

At La Grange, Electro-Motive builds new life into worn crankshafts. At each exacting operation, skilled workmanship is combined with modern, specialized tooling and rigid quality control. This is why Electro-Motive can offer new product warranty with every remanufactured crankshaft. Call your Electro-Motive Representative today for complete information.

61-R-8

ELECTRO-MOTIVE DIVISION · GENERAL MOTORS

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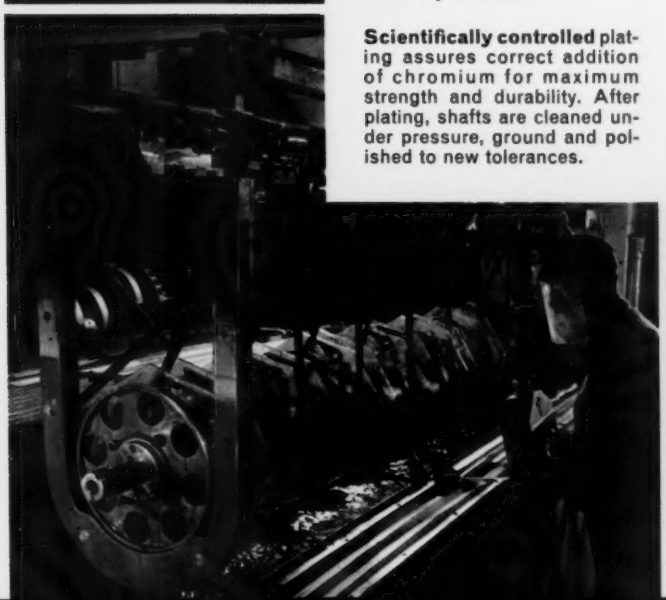
GENERAL MOTORS LOCOMOTIVES

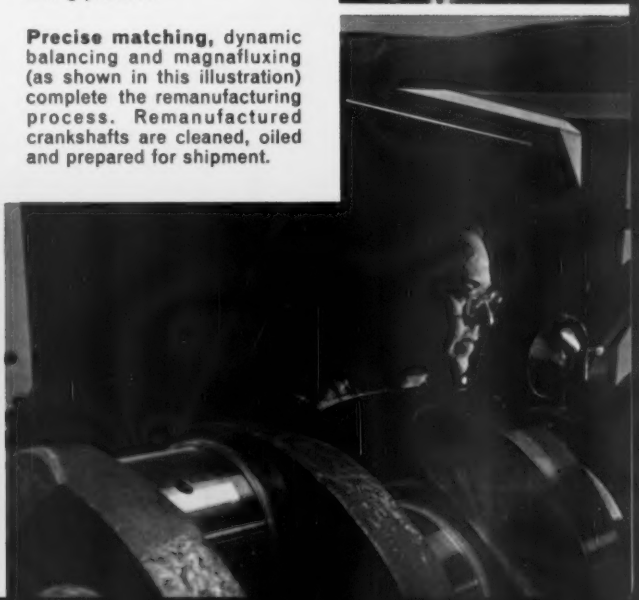
Crankshafts are first thoroughly cleaned and given a polish to facilitate inspection. *When necessary,* damaged tapered ends are replaced, counterweights added, couplings straightened, pilot concentricity restored.

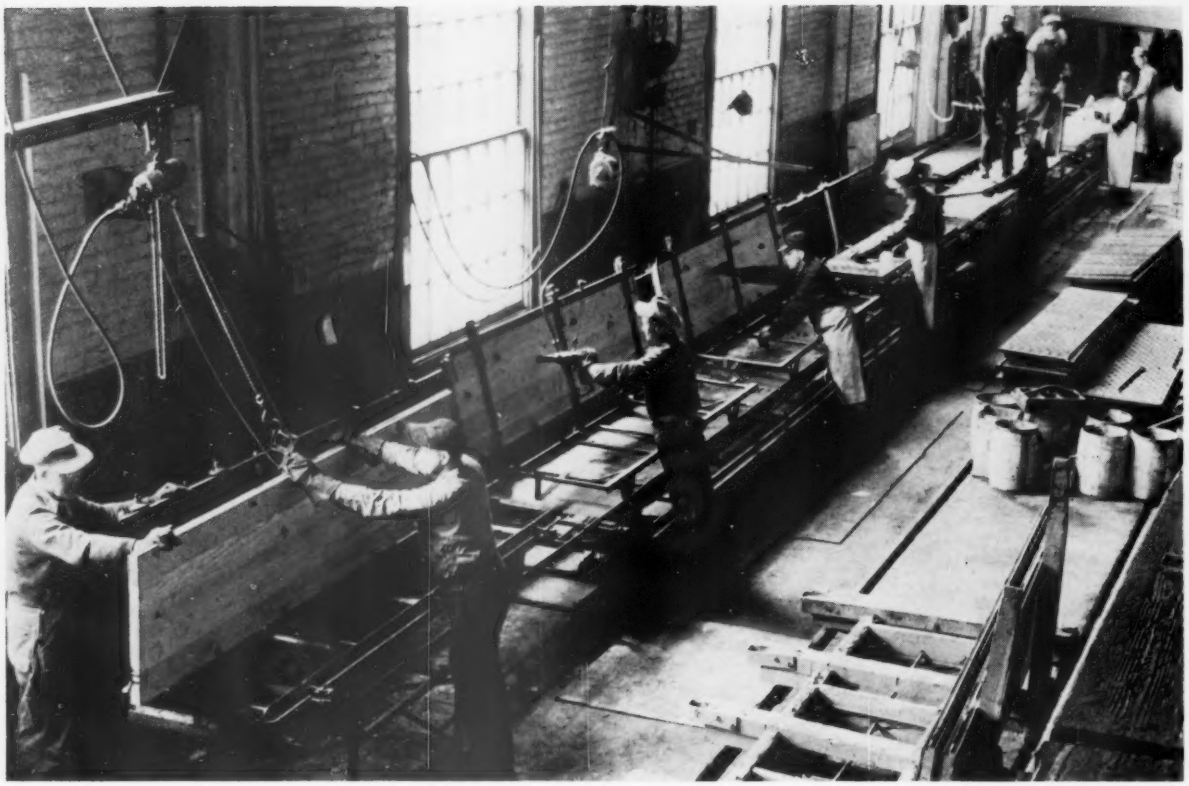
Precision equipment such as this straightening press, as well as special equipment for stress relieving, magnaflux inspections, controlled shot peening are all utilized in Electro-Motive's complete remanufacturing process.

Scientifically controlled plating assures correct addition of chromium for maximum strength and durability. After plating, shafts are cleaned under pressure, ground and polished to new tolerances.

Precise matching, dynamic balancing and magnafluxing (as shown in this illustration) complete the remanufacturing process. Remanufactured crankshafts are cleaned, oiled and prepared for shipment.





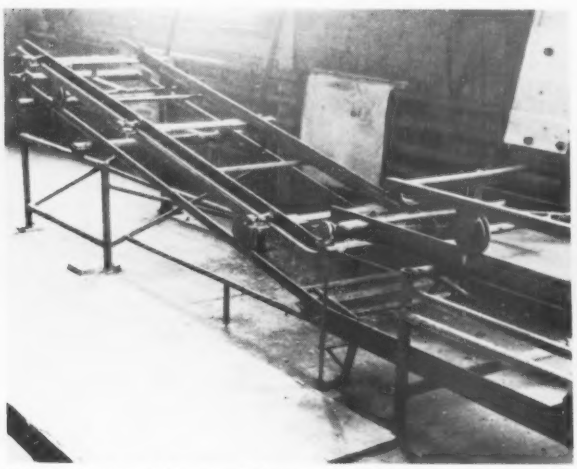


Floor sections for box cars which Great Northern builds at St. Cloud are assembled on eight-station production line. Floor panels consist of five boards and perforated steel flooring plates. Several styles of panels must be utilized in each type of car.

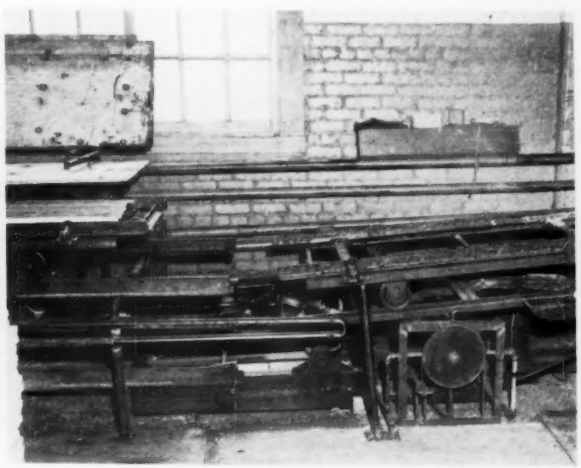
How Great Northern Prefabricates

An assembly-line procedure is used in prefabricating sections of flooring for box cars constructed at the Great Northern shop at St. Cloud, Minn. These floor panels consist of tongue-and-groove lumber and Standard Railway Equipment steel floor plates.

There are 14 panels per car, of three different sizes. The three types differ chiefly in the location of holes for bolts which attach the panels to the underframe at different locations in the car. During the assembly, all possible bolts are applied, leaving only those needed to secure the panel to the underframe. The panels are then bolted to the side sill and clipped to the floor stringers during assembly of the cars.



After finished panel is removed from production line at the final station, the track tilts down and returns the dolly to the first station on the lower set of rails in preparation for another panel.

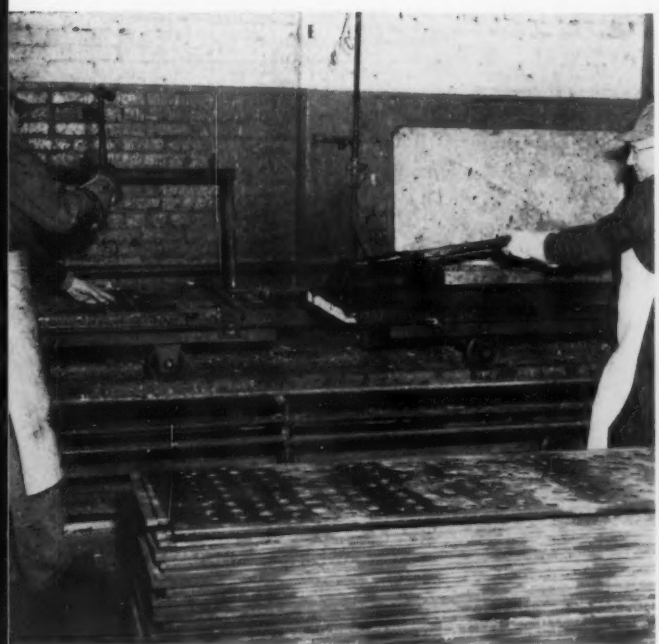


Dolly is moved along the lower set of rails to the initial station by an endless belt which runs the length of the production line. Dolly is then elevated to the rails on the working level.

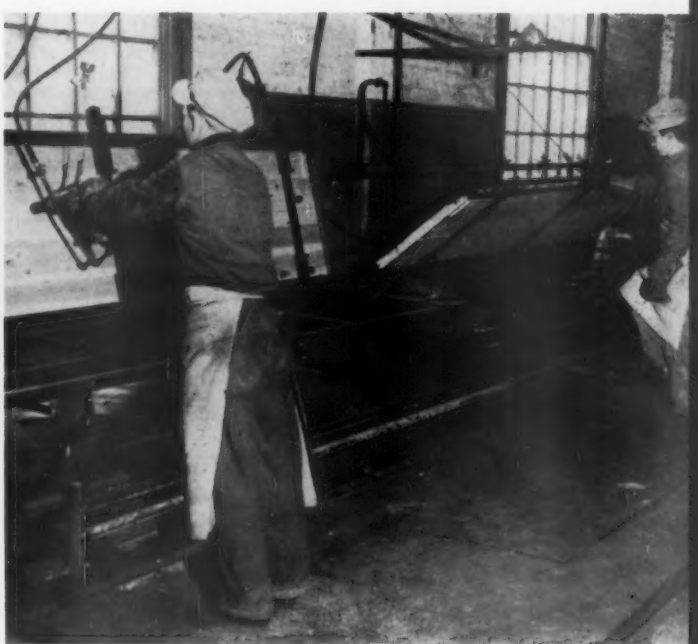
First step in production of panel is forcing boards together in jig. Flooring is cut to proper length.

Holes are marked on wood panels by tapping loose fitting pins in template at second station on production line. Holes are then drilled for steel plates.

Flooring Panels for Box Cars



Mastic is brushed on the floor panel at Station 4 before the steel plate is applied at Station 5. After the plate is in place, the bolts are driven through it.



Panel is raised on its side at Station 6 and nuts are run on the bolts already installed through boards and steel plate. At next station, the nuts are tightened with an impact wrench.

300-Ton Flat Car Built by D&H

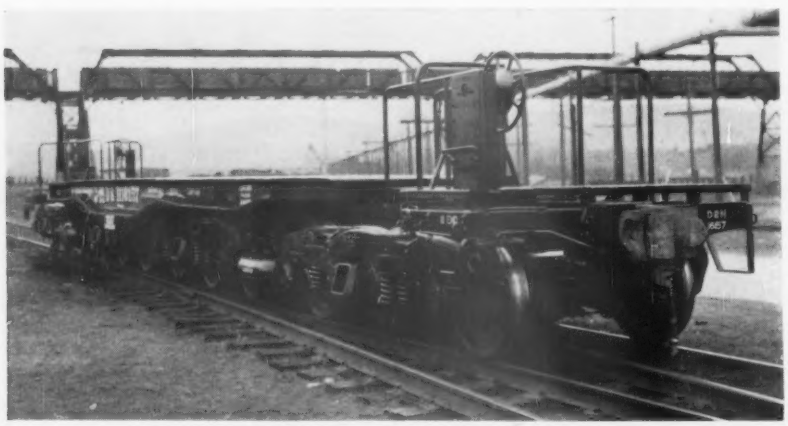
Car can carry loads which previously were beyond the capacity of any U. S. freight car

The world's highest capacity flat car recently completed its first transcontinental trip from the General Electric plant at Schenectady, N. Y., to Bellflower, Cal. The car, designed and built by the Delaware & Hudson, carried a 535,000-lb GE turbine during its first revenue movement—the trip to Bellflower. According to J. P. Hiltz, Jr., D&H vice president—operation and maintenance, the car was designed by D&H engineers and was built by the road's car shop at Oneonta, N. Y.

The *Railway Equipment Register* currently lists over 750 heavy-capacity and special-type flat cars in service in the U.S. and Canada, but none has the rating of this unit.

The 300-ton capacity of this new car is the highest on American railroads. Other heavy duty and depressed center cars on U. S. roads have a maximum capacity of 250 tons. The car cost $110,000, Mr. Hiltz reports. It will be available for transporting all types of machinery too large for other cars.

The load platform is cast nickel steel produced by General Steel Castings Corp. It is 35 ft 11¼ in. long,



Pair of trucks under each end of the car carries span bolster which supports one end of load platform casting. Each end of car has separate air-brake system.

PRINCIPAL SUPPLIERS OF EQUIPMENT

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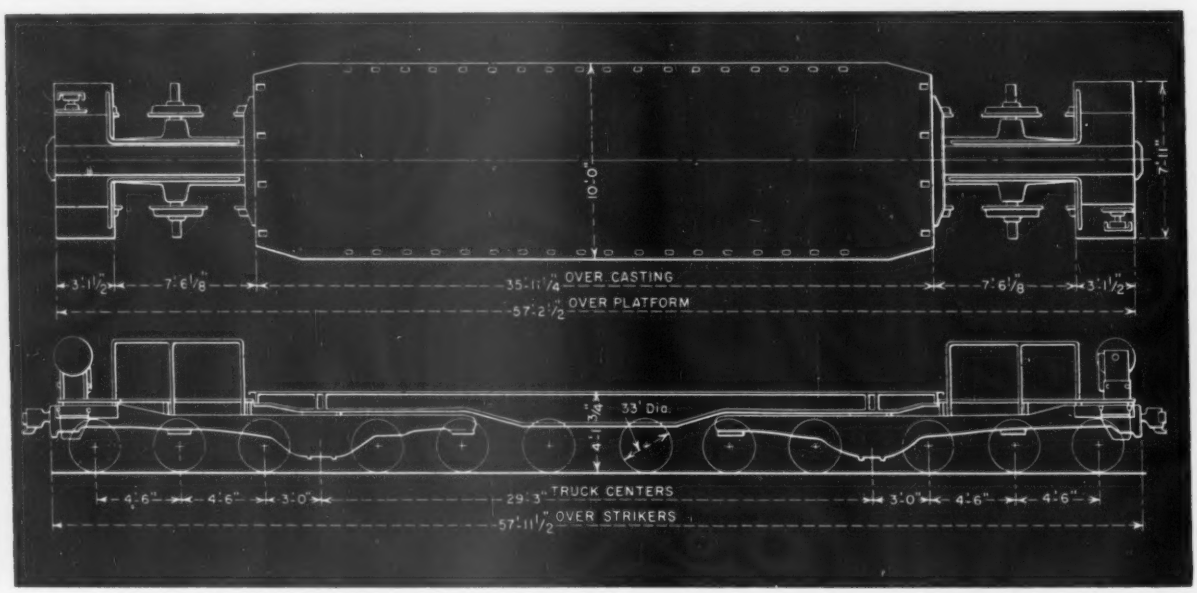
Standard Railway Equipment Div. of Stanray Corp.
Timken Roller Bearing Co.



"Biggest" flat car was designed by D&H mechanical department and assembled at D&H car shop. It is now available for all types of heavy loads. It is designed for 300 tons. Previous U. S. top carrying capacity was 250 tons.

10 ft wide, and its top is 4 ft 1¾ in. above the rail.

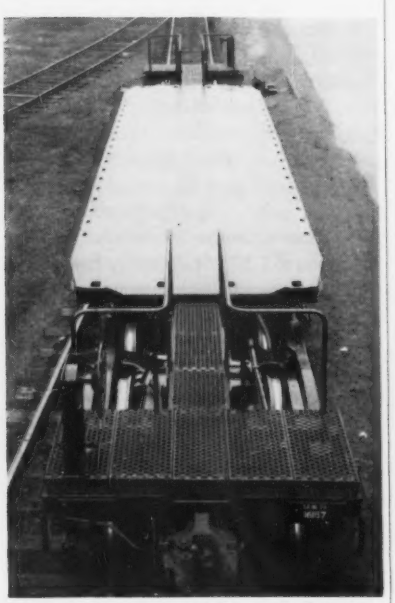
This load platform is carried on a pair of span bolsters which rest on four six-wheel trucks. Trucks are equipped with 6½- by 12-in. heavy duty roller bearings and 33-in. multiple-wear wheels. Each end of the car is fitted with a separate AB brake installation and Peacock handbrake. The car has Type F interlocking couplers. Span bolsters are topped with safety walkways and handrails, and the car complies fully with all federal and state requirements, according to the railroad.

Weight of Car

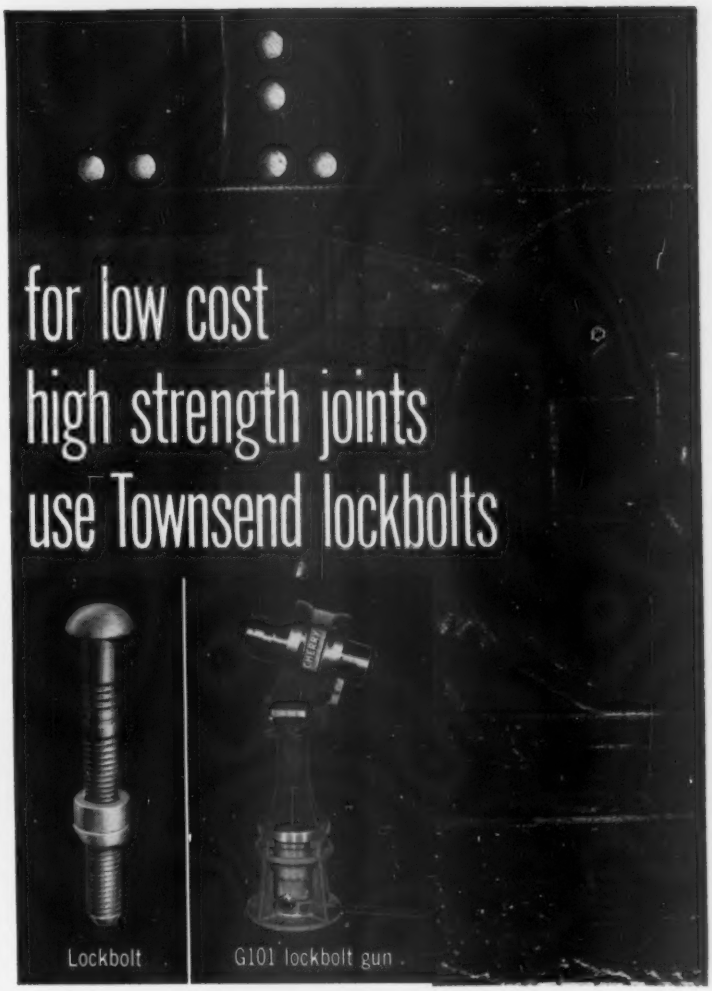
Overall length of the car over coupler pulling faces is 60 ft 6 in. The car weighs 148,300 lb and has a load limit of 604,700 lb, producing a maximum permissible rail load of 753,000 lb.

The turbine, which was the car's first load, was placed on board at GE's Schenectady plant on March 30. It moved over the D&H to Jefferson Junction, Pa., where it was transferred to the Erie-Lackawanna for the second leg of its journey to the Pacific coast.

Other roads which subsequently participated in this record movement were the New York, Chicago & St. Louis; Toledo, Peoria & Western; Atchison, Topeka & Santa Fe; Union Pacific, and Pacific Electric.



Stake pockets are provided at end of platform casting; tie-down holes are along the sides.



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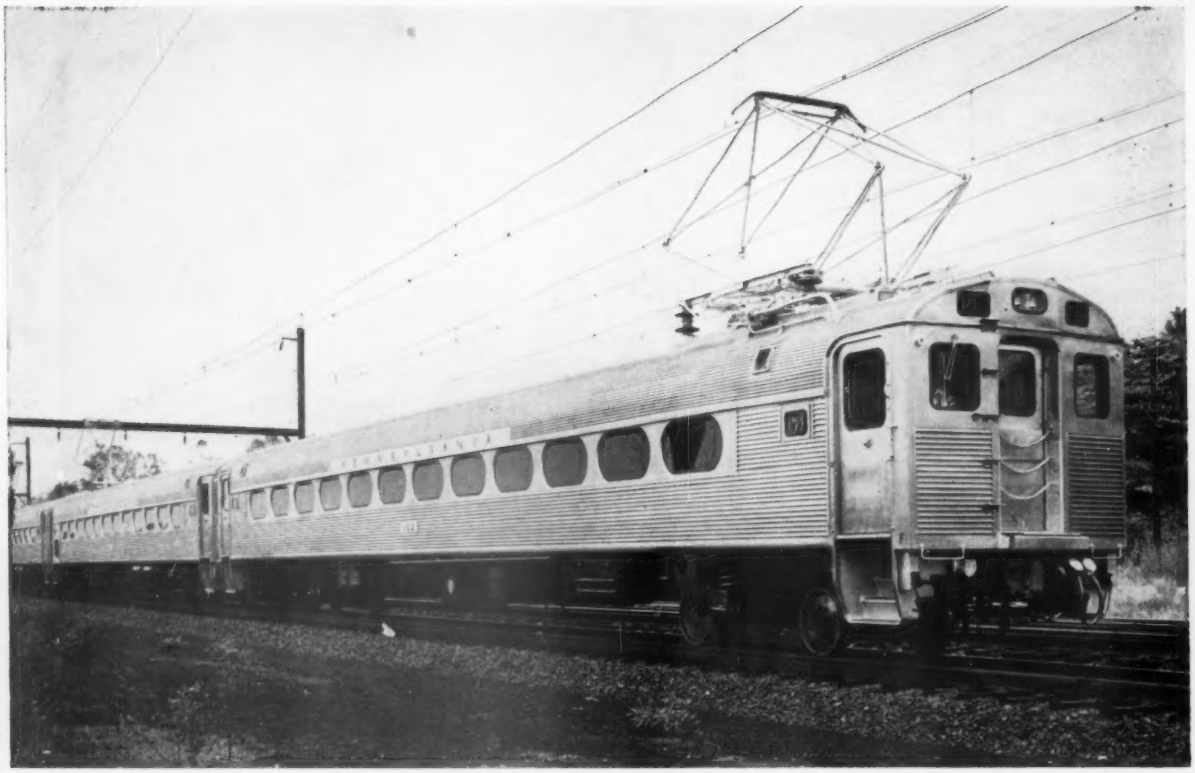

Pennsylvania put first silicon rectifier car in service last month; second car is now being converted at road's Paoli shop.

U. S. Roads Test Silicon Rectifiers

Silicon rectifiers have been installed on multiple-unit electric cars used for suburban service by the Pennsylvania and the New Haven. In both cases these semi-conductor rectifiers are replacing Ignitron (mercury-arc) rectifiers which were standard equipment for the cars when they were built in 1958 and 1954 respectively.

These are the first U. S. applications of an increasingly popular method for rectifying high-voltage alternating current to direct current on rolling stock equipped with d-c traction motors.

Lighter weight, simplified cooling, higher efficiency and longer life are among the reasons given for the application of semi-conductor rectifiers.

For some time an experimental 5,000-hp electric locomotive with this type of rectification equipment has been operated on the French National Railways. "This equipment has given complete satisfaction," M. Tessier, electrical engineer of the French National Railways reported recently. The French National was scheduled to receive fifteen 3,600-hp B-B type, silicon-rectifier freight locomotives last month. A substantial number of stainless steel commuter cars equipped with silicon rectifiers are also in operation in France.

The first U. S. application was made on a Pennsylvania Pioneer-type, multi-unit car (RL&C, August 1958, p 21). Ignitrons on this car were replaced by silicon rectifiers supplied by Westinghouse Electric Corp. Work was done at the Pennsy's Paoli, Pa., car shop in March. Conversion of a second car is now in progress.

The rectifier with its 56 diodes is mounted in front of the air intake for the traction motor blower fan. It is possible to eliminate the liquid cooling system which is needed with the mercury-tube rectifiers. This water-filled system includes a piping loop, pump, radiator, and anti-freeze protection.

Power from the catenary at 11,000 volts a-c is transformed to 780 volts a-c and is then passed through the rectifier where it is changed to 650 volts d-c for the traction motors.

If the silicon rectifier installations on the two PRR m-u cars are successful, the Pennsylvania will then apply silicon rectifiers to the 66 electric locomotives which are currently being built by General Electric (RL&C December 1960, p 50). While all these units were to have Ignitrons and the units now in service are so equipped, they have been designed so that the changeover can be made easily.

General Electric recently completed replacement of the ignitrons on one of the New Haven stainless-steel, multiple-unit cars with silicon rectifiers. A less complicated installation, reduced weight, and longer life were all goals. The silicon equipment weighs about one-third as much as the mercury-arc equipment, GE reports. In addition to eliminating the liquid cooling, there are no firing circuits. Preliminary work indicates that the silicon rectifier should last considerably longer than the Ignitron tube which has been found to have a 7-yr life.

Doc Discusses Effects Of Traction Gear Wear

By Gordon Taylor

The diesel maintainers were having a meeting of their local diesel club. They reported and discussed various types of trouble. One man was having engine failures involving scored crankshafts; another reported an epidemic of control wiring troubles. In the second case, it had finally been decided that, after years of service, it could be expected that wire and cable insulation would deteriorate to a point where rewiring would be cheaper than expensive train delays.

Pat Parker, a foreman from the Gulf Route, got the floor. "I've listened to your troubles and, while you have my sympathy, you don't really know what troubles are," he began. "We have had all the ones you've talked about. But right now we are having an epidemic of traction-motor failures. When a six-thousand dollar motor has to be rebuilt or replaced, your maintenance appropriation drains away fast.

"It wouldn't be so bad if these failures were spread out, but they are occurring with greater frequency. It's a problem that's got our management 'all shook up' and that could result in our maintenance forces being all shook up, unless we can determine the cause and sell management a program that will yield dependable service at reasonable cost. I'd like some advice and am wondering if Doc Watts would care to comment."

"I'd first want to know more about your troubles," replied Doc. "Do the failures follow any particular pattern?"

"Well," said Pat, "numerous failures have involved failure of armature bearings. There have also been motor failures in which bearings were not locked or broken. Some failures seem to be due to chafed or weakened winding insulation, burned commutators, and loosened armature bands."

"From what you say," Doc commented, "it would seem that these motors hurt all over. What sort of care are you giving them?"

"We've been giving them the same general care we gave our diesels the first five years we had them," Pat replied. "Most troubles have occurred in the past six months. The motors are getting older, but I don't think age is the only problem."

"I'll agree with that," said Doc. "There's bound to be something else. Can you think of any changes in your maintenance procedures? How often do you get an opportunity to make a close inspection of the traction motors when they are out from under the locomotive?"

"When we first got diesels," Pat replied, "we gave the motors a pretty close inspection each time they were removed from the truck for wheel changes. We would give the motor a thorough cleaning without dismantling and would motor it on the shop floor with current from a welding machine. We had an opportunity to check armature bearings for noise to check commutators to see if they were running true. It also gave us a chance to inspect motor pinions. None of these inspections cost much after the motors had been removed."

"If you continue these practices, it should keep you out of a lot of trouble," Doc said.

"Well, some things have changed," Pat explained. "We still make motor inspections at wheel changes, but they don't happen as often as they used to. We got a wheel-truing machine about two years ago that enables us to grind out flat spots on wheels and to restore the proper tread contour without having to remove the wheels from the locomotive. This enables us to get the locomotive back to service with much less 'out-of-service' time."

"That's right," Doc agreed, "but it doesn't give you a chance to make intermediate inspections that could lengthen traction-motor service life. It eliminates one opportunity for detecting and replacing motor bearings that are getting noisy and are potential failures. You don't have a chance to check the teeth of motor pinions and axle drive gears. Because pinions turn several times faster than axle gears, the wear on the pinions is much greater.

"It's my feeling that most railroads aren't paying as much attention as they should to pinions and gears. Too often the inspection stops when it is determined that there are no broken gear teeth. How many inspectors look carefully at the contour of the teeth of traction-motor pinions? It doesn't take long, and the dividends are big, if you do something about what you see. Careful inspection of gears and proper corrective action can do more for the welfare of your traction motors than almost anything else. Many motor failures are caused by the punishment inflicted by bad gearing.

"A good gear inspection can only be made when the motor is out of the locomotive. Many inspectors then fail to clean the gear teeth properly to check their condition. Although gears are covered by a sticky lubricant, don't let that stop you. The gear and pinion, like most diesel parts, have a story to tell the inspector, but they can tell it only when the part has been properly cleaned for a thorough inspection. You need to clean only two or three teeth to find out what is happening. Be careful how you go about this cleaning. The gear lubricant may hide jagged edges or very sharp burrs. It's best to wear heavy gloves and apply the solvent with a brush or plenty of rags.

"A damaged tooth profile will show a ridge across the face of the tooth. Some maintainers use templates or gages to help them judge the shape of the tooth. These templates are ground to fit correctly shaped teeth. When the template is placed against the face of the tooth, any change of shape is easily detected.

"On a badly worn gear you will usually find a 'shoulder' or 'step' at

(Continued on page 32)

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

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(Continued from page 29)

the base line. It does no harm as long as the same gear and pinion remain mated on the same gear center, for one has worn a pocket for the other, and they could continue to work together for a time. But when wheels are changed, the gear and pinion will be working with new partners. Then that 'step' on the worn gear can interfere with the tip of the tooth on a mating gear. The result is a clashing of steel on steel which no lubricant can prevent.

"New gears can be ruined when run against badly worn gear. Under these conditions, it should be no surprise if a tooth breaks or if armature parts or windings fail. In fact, defective traction gears will not keep their troubles to themselves. They insist on sharing them with every part of the driving motor.

"The teeth of a set of traction gears are formed in what is known as an involute shape. Because of this, the point of contact between pinion and gear always falls on the 'line of action.' Just imagine that the gear and pinion were two pulleys being belt driven. Then the line of action on the gears is the same as the position of the belt on a pulley drive. Under these conditions, power is transmitted smoothly, the gear and pinion acting like two pulleys connected by a non-slipping belt.

Now suppose you have a set of gears so badly worn that the involute shape is gone. That line of action is no longer constant. The action line jumps around like a belt on two flat sided pulleys. For this reason, worn gears set up terrific vibrations which travel to all parts of the motor. They enter the roller bearings of the armature, shortening their service life. The vibrations pass through the motor shaft into the armature core and into the windings, causing coil movement which chafes insulation. Vibrations also carry through to the armature head, causing balance weights to loosen in the magnet frame, breaking field coil and brush holder connections. You can imagine how they cause brushes to dance and ruin commutators."

At this point Pat stopped him. "You speak of these terrific vibrations. Can you give us some idea of what you mean by terrific?"

"Be glad to," answered Doc. "Consider for a moment that we have a 15-tooth motor pinion operating at 50 mph. My data book, which I am consulting, shows that a freight unit with 40-in. wheels and 62 tooth gear will have a motor speed of 1,720 rpm at 50 mph. A worn 15-tooth pinion operating at 1,720 rpm will be pounding at the shaft 1,720 times 15, or 25,800 blows per minute.

On a passenger unit with 20-tooth pinion running at 70 mph, the motor will operate at 1,862 rpm. On this unit, a bad pinion will be pounding at the shaft 1,862 times 20, or 37,240 blows a minute. At that rate, in thirty minutes the bad pinion will have delivered over a million blows into the armature and its related parts.

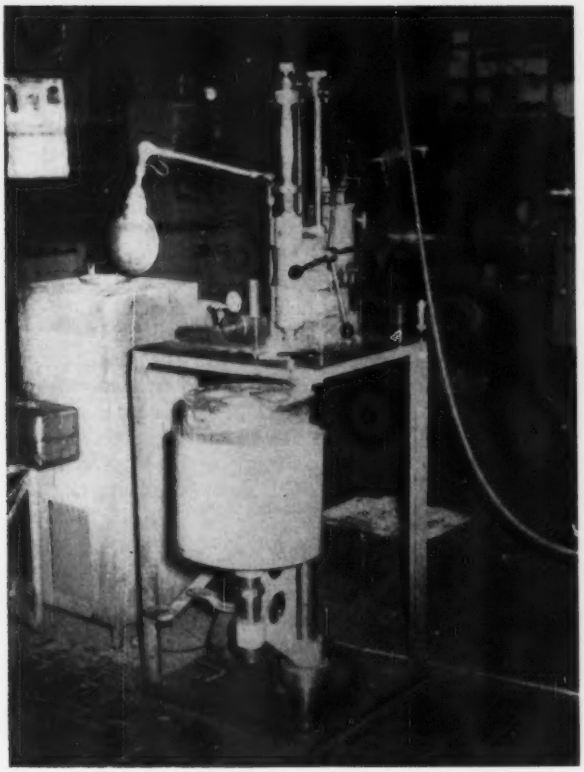
"Remember the old saying, 'The constant drip of water can wear away the hardest stone.' Of a diesel, it may be said that the constant pound of driving gears will eventually KO a traction motor.

"Now, Pat," Doc continued, "I believe that, while your wheel-truing machine is saving you money on wheel changes, it may be the indirect cause of traction-motor failures by depriving you of the opportunity to clean, inspect, and check traction motors as frequently as you did a few years ago.

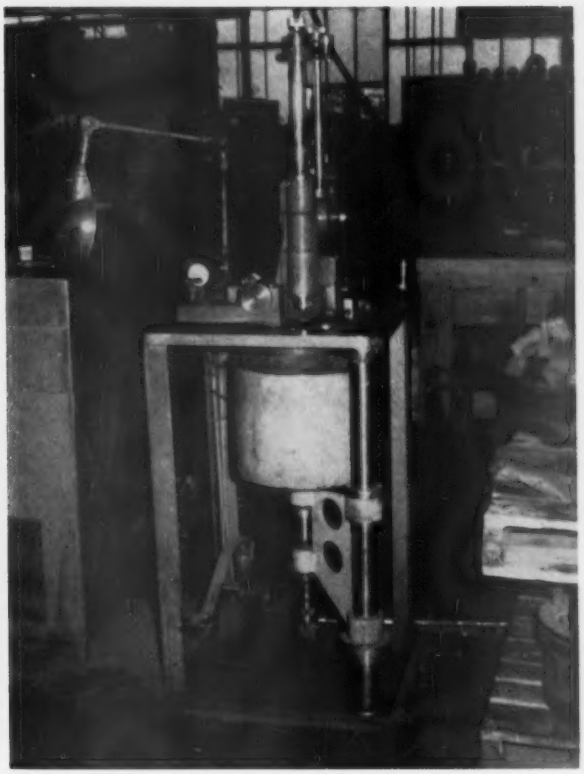
"More frequent inspections of motors while they are out of the trucks will not cure all the troubles, unless the gears are carefully inspected and appropriate action taken to correct what the inspections reveal. There is no hard and fast rule on when to replace gears. It depends on class of service and operating speeds. On a switcher, in slow speed service, the damage caused by bad gears would not be as severe as that developed by high-speed road service.

"When we started this discussion, Pat, you said your management was all shook up by your traction-motor trouble. It's my opinion that your traction motors are also all shook up by having to run too long with defective gears. I recommend that your people study this situation to see whether it would be better to save all the money on wheel changes, or whether it would be better to set up a program that recognizes the need for some intermediate inspection of traction motors and gears. Certainly the wheel-truing arrangement has advantages, but there is also need for a program that allows proper motor inspection.

"Locomotive builders recognize the importance of good gears for satisfactory performance of their products and would be able to offer some good advice."



Head is inverted and mounted on top of hydraulic lift for machining.



Boring of valve seats progresses rapidly because of indexing device.

Santa Fe Shop Solves Its Problem...

Economical EMD Head Reclamation

Extensive tests showed the Santa Fe that reclamation of EMD cylinder-head exhaust-valve seats could be an economical procedure if the labor costs could be reduced. The Cleburne, Tex., shop has developed equipment which more than doubles the output of heads in which valve seats require reclamation.

When the Kwikway Model Fx cylinder-boring machine was first put in service at Cleburne and used for insert work, each valve seat had to be set up individually with its guide before it could be bored accurately to receive the insert. It had been found that accuracy had to be maintained so that inserts would not fail in service.

Setting up the cylinder-boring machine in this way was very slow and the cost of reclaiming each head was approximately $23.68. Because it was possible only to machine four or five heads during an 8-hr shift, the high reclamation cost resulted. It was decided to speed this machining up to cut the labor cost. Material costs are constant.

A jig with a flat surface top was designed to position the boring machine. This top is bored to fit the firing ring surface of the head. Under it is a revolving pivot which fits the injector cavity in the inverted head. Below this pilot is a foot-operated Studebaker PV-3 hydraulic unit which lifts the head into place and holds it against the top plate with approximately 1,000 lb pressure.

Indexing Device

On top of the table is an indexing device which makes it possible to aline the boring machine over the adjacent valve-guide hole. With the indexing shaft in place in one valve-guide hole, the boring machine can be alined with the next valve guide by using mandrel which fits the boring machine's toolholder. The boring device is then located centrally over the valve seat to be bored and is tightened on the table. With 700 psi pressure in the hydraulic cylinder, the head is fixed during boring. After the boring machine has been tightened on the top plate and the indexing guide correctly positioned, all succeeding heads can be indexed and bored from this setting.

To apply these inserts, it is necessary that they be cooled so they will shrink to fit the hole bored for them. Not having access to dry ice, Cleburne shop rebuilt one of the refrigerated drinking-water coolers used in diesel locomotive cabs. The water-storage chamber was removed and a receptacle for holding the inserts was encased in the freezing coils of the unit. This container has a capacity of approximately 50 inserts. It has proved to be a very satisfactory device for preparing the inserts for installation in the head.

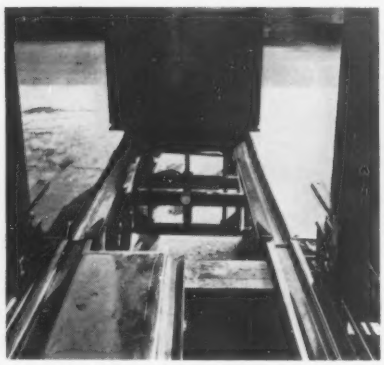
With the new procedures and tooling, Cleburne was able to increase production to 12 heads per 8-hr shift.

REA Express Testing Container Cars

Containerization in various forms is being investigated and utilized by REA Express in its intensive effort to develop a profitable method for handling small package shipments. REA Express, successor to the Railway Express Agency, has just begun an experimental operation, between New York and St. Louis over the Pennsylvania. Two newly developed container cars are being used.

One of these cars is a General American G-85 piggyback car equipped to handle twenty 212-cu ft Fruehauf containers. The other is a Pullman-Standard 85-ft skeleton container car designed to handle sixteen 261-cu ft Trailmobile containers.

The ability to load and unload containers rapidly is an important feature of the new REA Express program to overcome problems associated with economical movement of small shipments. On the New York to St. Louis run, one or more containers are removed at Dayton, Ohio; Indianapolis, Ind., and Terre Haute, Ind. Containers removed at these intermediate points will be loaded with New York shipments and will again be placed on the cars when they return on their eastbound trips.



Channel bridges on truck lower to meet corresponding channels on GATC rack-cradle.

Loading is completed as end stops are locked to secure container.

Necessary rapid handling at intermediate points is made possible by REA-designed hydraulic, variable-height platform trucks. Containerized express shipments can be transferred to and from fast passenger trains during brief stops.

The General American G-85 piggyback car accommodates four demountable REA container rack-cradles which are cushioned on the Clejan shock absorbers that are built into the deck of the car for cushioning trailers and containers in conventional piggyback service (RL&C, Oct. 1959, p 27). This shock-absorbing mechanism has a maximum of 11 in. travel in each direction. The car is not changed structurally for use in the REA Express operation. For passenger service, it has been equipped with steam and train signal lines. Complete with racks, the 85-ft car's light weight is 71,000 lb.

The demountable rack-cradle, 20 ft by 8 ft, carries five containers in transverse channels. A screw-type, hold-down device raises and clamps each container in its two channels for rail movement, removing weight from the container's four casters which are used for rolling it on and off the car and for moving it on station platforms. The

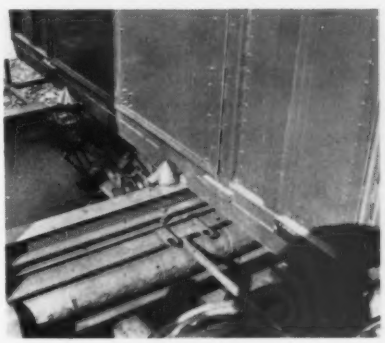
Four rack-cradles cushioned on deck of G-85 piggyback car hold 20 Fruehauf magnesium containers.

Sixteen side-loaded Trailmobile containers can be carried on Pullman-Standard skeleton container car designed for passenger-train service.

rack-cradle loaded with five containers can be end-loaded on the car from a flat-bed truck, utilizing the components of the Clejan system developed for handling 20-ft and 40-ft containers. Hinged extensions of the transverse channels serve as container stops when raised, and, when lowered, act as bridges to the platform truck or to a platform. It is possible for the car to carry one or more rack-cradles and other types of containers simultaneously.

The 212-cu ft Fruehauf magnesium container has a width of 7 ft 10⅜ in., a height of 8 ft 2¾ in., and a length of 3 ft 8¾ in. It has a light weight of 496 lb and a 4,000-lb capacity. There are 41-in. by 83-in. double-swing doors in one side and one end, fitted with piano-type hinges and rubber gaskets. The container has a magnesium 0.125-in. tread-plate floor. Sides are 0.156-in. magnesium. Lifting rings, fork-lift plates, and tow bars are standard.

The 50-ton capacity, 87-ft skeleton-type Pullman-Standard car, equipped for passenger service, has a stationary container rack consisting of two I-beams running the length of the car atop the center sill. Top of the center sill is 41½ in. above the rail. The two 6-in. I-beams are 39½ in. apart. Steel cones with wing tips placed at 5-ft intervals on these beams secure the containers. After disengaging a safety latch, a lever is shifted to unlock all the hold-down cones on one beam simultaneously. The process is then repeated to disengage cones along the opposite beam.



Locking cones secure container on P-S car and rollers are raised to move container on or off.

Operating mechanism at one end of car engages all cones on one side simultaneously.

Transfer of the 5-ft containers to and from the REA hydraulic variable-height platform truck is accomplished by the raising steel rollers on the P-S car and winching the container on to similar rollers on the edges of the platform truck. After roller wheels on the car are raised by chains, which are attached to their elevating mechanism from the platform truck, a link-chain pulley system makes it possible to move containers.

This "all-container" car is built not only to handle the smallest 5-ft containers, but can carry others in 10-ft modular lengths up to 40 ft. A variety of different sizes can be carried simultaneously.

The Trailmobile containers are made of 16-gage steel with exposed integral posts. They are 4 ft 10¼ in. long, 8 ft wide, and 8 ft high. Each container weighs 1,450 lb and has a payload limit of 4,550 lb. In the two ends and one side are 51-in. by 87-in. door openings, each having rubber-sealed, piano-hinged, double-swing doors. Floors are ¾-in. oak.

Light weight of the P-S car is 45,900 lb, and sixteen loaded containers weigh 96,000 lb. Tests at the P-S research laboratory in Hammond, Ind., have shown that the cone-type hold-downs on an uncushioned cradle comprise "an arrangement completely adequate for passenger-train service."

(Continued from page 5)

Equipment Orders

Orders for new freight cars placed during March totaled 1,796 as compared with 1,536 for February 1961. March 1960 orders totaled 1,957. On April 1 there were 15,801 cars on order and undelivered. This compares with 18,429 cars on order and undelivered on March 1, and 42,131 on April 1, 1960. Additional orders and programs announced since the closing of the April issue follow.

The *Canadian Pacific* plans to spend $17,761,345 in 1961 for new equipment, including 1,300 box cars and 100 covered hopper cars. 300 50-ton steel-sheathed, wood-lined box cars have been ordered from Dosco Trenton Works, Trenton, N.S. These insulated cars to be 41½-ft, 3,350 cu ft capacity, for heated service during winter months.

Completion of *Chicago & North Western* modernization of suburban passenger service in 1961 will include delivery of the last 68 of 116 double-deck cars ordered from Pullman-Standard; conversion of 48 1955-56 double-deckers for push-pull operation ($2 million), and installation of auxiliary equipment in 25 locomotives to be used in push-pull service ($1.1 million).

The *Delaware & Hudson* will spend $13,700,000 during 1961 for maintenance work—of this, $8,700,000 for maintenance of equipment. This is in addition to an appropriation of $3,400,000 for capital expenditures for additions and betterments to road and equipment, including purchase of 6 new and 6 completely rebuilt diesel locomotives. Maintenance of equipment program includes heavy overhaul of 28 diesel locomotives, repainting 70 locomotives in new D&H colors, heavy repairs to 450 freight cars, and repainting 1,500 freight cars in new Oneonta, N. Y., paint shop. In making this announcement, J. P. Hiltz, Jr., vice-president in charge of operation and maintenance, said that, if business conditions warrant and demand for freight cars increases, maintenance of equipment program and expenditures will be increased accordingly.

The *Denver & Rio Grande Western* has ordered 150 70-ton covered hoppers from Greenville Steel Car Co. for July delivery.

The *Frisco* is currently running tests on the 119-ft Auto-Porter, the bi-level, articulated auto car developed in Germany and recently exhibited in the U. S. by North American Car.

The *Great Northern* has ordered 10 40-ton steel cabooses from International Car, for delivery this month, and 50 50-ton box cars from Pacific Car & Foundry, for August delivery.

The *Gulf, Mobile & Ohio* has received delivery of 45 50-ft box cars from American Car & Foundry Div. at a cost of about $5,000,000.

Maine Central equipment modernization program calls for the purchase of "at least 200 50-ft box cars each year for four and, perhaps, five years," all to be equipped with roller bearings and special loading devices; purchase of additional piggyback cars; conversion of gondolas for limerock service, and acquisition of 20 bulkhead type sideless pulpwood rack cars. President E. Spencer Miller has said program depends upon whether the Maine legislature acts to reform Maine's present gross receipt tax on railroads.

The *Milwaukee* will acquire six remanufactured 2,400-hp diesel-electric passenger units.

The *Missouri Pacific* has ordered 500 roller-bearing box cars from Pullman-Standard, at a cost of $5,000,000, for June-July delivery.

The *New Haven* has placed in service the first of 100 refurbished passenger coaches. Renovated cars are being put into service at a rate of two per week. Meanwhile, NH stockholders have approved acquisition of 100 new commuter coaches (RL&C, April 1961, p 8). Fifty will be leased for a 25-yr term from the Port of New York Authority, the remainder purchased under private financing.

The *New York Central* has ordered 30 new 2,000-hp general-purpose diesel-electric locomotives at a cost of $5,360,000—15 from EMD and 15 from Alco. Deliveries to begin in June. The road is also converting ten roomette cars, designed for 22 first-class passengers, into 36-passenger "Sleeper—coaches." The work is being done at Budd's Red Lion Plant at a cost of roughly $100,000 per car.

Relief measures for New York State commutor railroads passed by the state legislature have now become law, with the signature of Governor Rockefeller. The *New York Central, New Haven,* and *Long Island Railroad* get $8 million in tax relief and will, in turn, order 230 new commuter cars—100 for the NH, 65 for the LIRR, and 65 previously announced for the NYC.

North American Car and the *New York Central* are testing General Motors Diesel Ltd's new Portager, a 44-ft four-wheel flat adaptable either for trailers or containers.

The *Santa Fe* equipment acquisition program for 1961 will include 25 baggage cars, in addition to 1,755 freight cars previously reported by the road. $37.9 million of total capital improvements budget for the year (approximately $65 million) will be spent for equipment. 60 2,600-cu ft capacity Airslide covered hopper cars have been ordered from General American—25 for immediate delivery; the remaining 35 for delivery beginning in October.

The first diesel-hydraulic locomotive for service in the U.S. has been completed by Krauss-Maffei in West Germany, and tests are now under way on the German Federal Railways. The unit is one of six being built for *Southern Pacific* and *Denver & Rio Grande Western*. Delivery of all the units is scheduled for early next fall, according to reports from German sources.

The *Texas & Pacific* has ordered 35 70-ton insulated box cars from Pullman-Standard at a cost of $705,000, for May-June delivery.

Trailer Train has ordered 293 king-size flat cars for hauling highway trailers and new automobiles and will order 207 more in the near future. Cost for all 500 cars will be over $7 million. Cars on order will be of two-trailer capacity and have roller bearings and other features for high-speed service. ACF will build 100; Bethlehem Steel, 60; GATC, 25, and Pullman-Standard, 108.

The *Union Pacific* has purchased 65 70-ton, roller-bearing-equipped covered hoppers from Pullman-Standard.

The *U. S. Government* has ordered 23 100-ton helium cars from ACF at a cost of $2,300,690.

GM Charged With Anti-Trust Violation

General Motors Corp. has been indicted by a federal grand jury in New York on charges of using its economic power illegally to monopolize manufacture and sale of locomotives. From 47.1% in 1946, the indictment asserted, GM increased its share of the business to 84.1% last year. Meanwhile, Alco dropped from 39.7% to 13.1%, and Fairbanks, Morse & Co., and Baldwin-Lima-Hamilton Corp. were driven from the market. Another allegation was that General Electric has not yet sold a [high-horsepower domestic] diesel locomotive, although a year ago it announced its entry into this field.

"General Motors is not guilty of the monopolistic practices charged in the indictment," GM Chairman F. G. Donner commented following the grand jury action. "This will be clearly established at the trial. General Motors is proud to stand on its record in the development, production and sale of diesel electric locomotives, which demonstrates a major contribution to the railroad industry and to the transportation economy."

The federal indictment, which charged GM with violating Section 2 of the Sherman Antitrust Act, listed ways in which GM allegedly forced railroads to buy locomotives built by its Electro-Motive Division. The list, as summarized in Attorney General R. F. Kennedy's announcement, included:

- Routing rail shipments to favor purchasers of GM locomotives and withholding or reducing shipments from lines which purchased locomotives from GM competitors (The indictment said GM is possibly the country's largest shipper.)
- Building GM facilities near lines of railroads to persuade those roads to purchase GM locomotives.
- Financing sale or lease of locomotives on terms its competitors could not match.
- Participating in formulation of locomotive specifications for use in obtaining competitor bids which prevented other manufacturers from competing.
- Selling locomotives at a loss in segments of the market where it had competition.

Along with the denial of guilt, Mr. Donner stated. "It is difficult to understand why after so many years of business operation by General Motors in this field, with so much data and information known to and available to the government, it should now file this proceeding.

"Commencing in 1956, and for a period of months, General Motors made available (to the Department of Justice) documents, statistical data and files relating to its diesel electric locomotive business. In 1955, representatives of General Motors and others testified in detail before the sub-committee on antitrust and monopoly of the Committee on the Judiciary, United States Sen-

ate, covering the history and business activities of General Motors' locomotive business from 1936 through the first nine months of 1955.

"For years, General Motors has been the leader in this field. This was inevitable, considering that it was the innovator and over the years has concentrated on the development and improvement of the diesel, while competitive manufacturers were still promoting the sale of steam locomotives.

"The success of General Motors in this venture has not been a secret . . . That General Motors' leadership in the locomotive field has not been the result of any monopolistic practices is evidenced by the acclaim of our customers, the railroads, who certainly know best why they bought our products. Contrary to the charges, the purchasers of locomotives and the public have derived great benefits from General Motors' leadership in this field."

Letters to the Editor

Too Many Charges?

TO THE EDITOR:

The economic recession is, we hope, only a temporary situation. The railroad industry, however, has been in an economic recession for more than a dozen years. During this period, railroads have suffered a continuous loss of business and revenue. Obviously, there is a clear need to cut expenses.

It is, and has been, the practice of railroads over the years to repair foreign-line cars in interchange when such repairs are necessary and, through a central accounting system, to bill the car owners for such repairs. Very often railroad managements make the mistake of assuming that they are saving money by issuing as many billing repair cards as possible to offset the costs of repairs made to their own cars by other railroads. Railroad car repair shops and repair tracks are usually operated quite efficiently. The repairs and subsequent billing are perfectly legitimate.

But what about the train yards? Don't zealous car inspectors replace many brake shoes and air hoses that have not yet reached condemning limits only to make as many repairs as possible? Haven't many car inspectors replaced the first convenient journal-box lid or brake shoe key just to "make a showing" for the day?

Consider one shoe, one box lid, one hose, or one shoe key applied improperly by one car inspector and multiply this by thousands of car inspectors. This is an unwarranted burden on the financial structure of the railroad industry.

Rule 108 of the AAR car interchange rules should be modified so there would be no labor or material charges allowed for renewal of brake shoes, shoe keys, journal-box lids, and air hose when this work is done in the train yard. Charge should be allowed, however, for these repairs while a car is in a car repair shop or on a repair track.

This innovation could eliminate waste, and offer savings to the railroad industry at large and to private car-line owners.

A Reader

Personal Mention

Baltimore & Ohio.—*Baltimore, Md.:*—Title changes—F. H. EINWAECHTER, chief engineer motive power and equipment, now chief engineer motive power. W. A. MULLEN, superintendent mechanical methods and procedures, now superintendent mechanical methods.

W. D. Dickie

Canadian Pacific.—*Montreal:* W. D. DICKIE, assistant chief of motive power and rolling stock, appointed chief of motive power and rolling stock, succeeding LEO B. GEORGE, retired.

Mr. Dickie entered Glen Yard shops in Westmount as a machinist apprentice in October 1915. Subsequently became machinist at Winnipeg; draftsman and shop engineer; chief draftsman; general foreman at Moose Jaw, Sask.; division master mechanic at Calgary; assistant to the chief of motive powers in Montreal; assistant works manager, and works manager, Angus shops. Became assistant chief of motive power in August 1957.

Canadian National.—ATLANTIC REGION: H. H. HICKS appointed superal superintendent equipment, *Moncton, N.B.* MOUNTAIN REGION, *Edmonton Area:* A. MACIVER appointed superintendent equipment; F. C. FRASER, assistant superintendent equipment, and C. RUDOLPH, road foreman of engines. *Calgary Area:* R. B. GILCHRIST appointed superintendent equipment, Calgary. *Hudson Bay Area:* BERNARD GASIOR appointed superintendent equipment, Dauphin, Man. *British Columbia Area:* R. M. COWAN appointed superintendent equipment, and F. F. GRAY, assistant superintendent equipment, Vancouver. PRAIRIE REGION, *Winnipeg Area:* H. A. MCDONALD appointed assistant superintendent equipment, Winnipeg. *Assiniboine Area:* S. A. PAYNE appointed superintendent equipment, Winnipeg.

Chesapeake & Ohio.—*Richmond, Va.:* R. E. CARTWRIGHT appointed electrical inspector. *Huntington, W. Va.:* B. L. STEVENS appointed assistant engineer, succeeding Mr. Cartwright.

Elgin, Joliet & Western.—*Joliet, Ill.:* CLETUS G. MAHONEY, superintendent of motive power, assuming direct supervision of locomotive department. WILLIAM J. MCGAHEY

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appointed diesel shop foreman (nights). CLYDE M. YAHNKE appointed erecting foreman—light repairs. FREDERICK C. PIERCE, JR., appointed erecting foreman—heavy repairs. *Waukegon, Ill.:* BERT J. REGAN appointed general mechanical foreman, with supervision over locomotive and car department.

Florida East Coast.—*New Smyrna Beach, Fla.:* JOHN SIMS appointed shop superintendent, locomotive department.

Gulf, Colorado & Santa Fe.—*Cleburne, Tex.:* D. J. EVERETT appointed superintendent of shops—master mechanic, Northern division, succeeding J. D. NIMMO, retired. Mr. Everett formerly superintendent of shops—master mechanic, Western Lines, Santa Fe, Albuquerque, N.M. C. W. CRAMER, general foreman—diesel, appointed assistant superintendent of shops—locomotive. O. H. BARKER, JR., superintendent car department, appointed assistant superintendent of shops—car.

ICC, Bureau of Safety and Service.—*Pittsburgh, Pa.:* GEORGE L. HENDERSON, inspector of locomotives, Section of Locomotive Inspection, retired.

Louisville & Nashville.—*Louisville, Ky.:* WILLIAM C. ROLLINGS appointed assistant manager—planning-production, chief mechanical officer's office. *South Louisville, Ky.:* RUFUS J. MAY, assistant shop superintendent, appointed shop superintendent, succeeding Mr. Rollings.

New York Central.—*New York:* P. R. OLIVER appointed general supervisor car maintenance. W. L. O'CONNOR appointed general supervisor locomotive maintenance. E. L. HYATT appointed supervisor of safety and training—mechanical. *Collinwood, Ohio:* J. J. GREGORY appointed supervisor of cost control. R. A. JOHNSON appointed process engineer.

Santa Fe.—*Albuquerque, N.M.:* D. L. QUANEY appointed assistant master mechanic, New Mexico division.

Southern.—*Knoxville, Tenn.:* HAROLD K. MADDOX appointed road foreman of engines.

Terminal Railroad Assn. of St. Louis.—*St. Louis, Mo.:* H. G. FIELD appointed superintendent motive power and equipment, succeeding GEORGE B. MILLER, retired. FRED C. WHITLOCK, assistant to superintendent motive power and equipment, retired.

Texas & New Orleans.—*Houston, Tex.:* P. B. RICE appointed master mechanic, Lafayette and Houston divisions. *San Antonio, Tex.:* E. I. NORMAN named master mechanic, San Antonio and Dallas and Austin Divisions.

OBITUARIES

John J. Tatum, 94, who retired in 1942 as assistant chief of motive power and equipment of the Baltimore & Ohio, died in Baltimore on March 28.

Harry C. Oviatt, 89, retired general mechanical superintendent, New Haven, died March 10 in Ridgefield, Conn.

Supply Trade Notes

RAILWAY SERVICE & SUPPLY CORP. —*T. C. Coleman & Son*, Louisville, Ky., and the *O. K. Co.*, Chicago, appointed distributors in respective areas for conditionally approved Utility and Optimum lubricators.

■

GUSTIN - BACON MANUFACTURING CO.—*Thomas N. Collins* and *W. F. Bartholomae, Jr.*, appointed representatives, Chicago railroad sales department.

■

GOULD-NATIONAL BATTERIES, INC.; PURE OIL CO.—*Gould-National* and *Pure Oil* have signed a contract for a joint research program on fuel cells and fuels. Program under direction of Dr. Royce E. Biddick of Gould-National research staff.

■

BALDWIN-LIMA-HAMILTON CORP.—*Donald Lade*, assistant general sales manager, named general sales manager of *Standard Steel Works*, division of BLH, at Burnham, Pa.

■

GENERAL ELECTRIC CO.—*Charles F. Garney* appointed manager of railroad sales, national accounts department. *Robert M. Coultas*, manager of transportation sales, East Central Region, named manager of domestic locomotive sales.

■

HALL-TOLEDO, INC.—*Donald J. Leonard* appointed Michigan representative.

■

ELECTRO-MOTIVE DIV., GENERAL MOTORS.—*Frank J. Chambers* appointed assistant manager, parts supply, succeeding *D. A. Warren*, retired.

■

OWATONNA TOOL CO.—*S. L. Richmond* appointed sales manager, Tools and Equipment Div. *Gordon F. Packer*, Orange, Calif., named district sales representative for Southern California and Arizona, and *Ralph W. Long*, Arcadia, Calif., sales representative for Central California and Clark Co., Nevada, OTC Tools & Equipment Div.

■

SYMINGTON WAYNE CORP.—*Robert P. Messimer*, sales engineer at New York, appointed district sales manager, Symington Div., at Chicago.

■

EX-CELL-O CORP.—*Ex-Cell-O Machinery Sales* established at 12200 S. Bellflower Blvd., Downey, Calif., to handle factory sales and service not only of Ex-Cell-O machine tools, but also those of Bryant Chucking Grinder Co. and Michigan Tool Co., subsidiaries of Ex-Cell-O, in Southern California area. *Howard H. Schrock* is district manager.

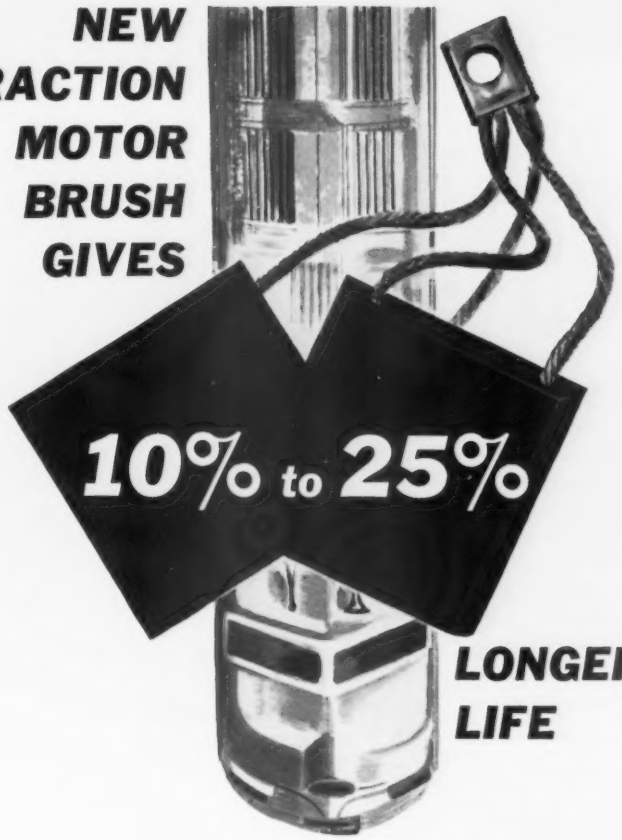
■

ELECTRIC STORAGE BATTERY CO.—*James A. Mustard, Jr.*, general sales manager, Nickel-Alkaline Battery Division, promoted to assistant to vice-president—marketing, Industrial Marketing Division, at Philadelphia, Pa.

OBITUARIES

FRANK S. CARLILE, co-founder of C & D Batteries, died suddenly on March 30 after suffering a heart attack in Valpariso, Chile.

NEW TRACTION MOTOR BRUSH GIVES



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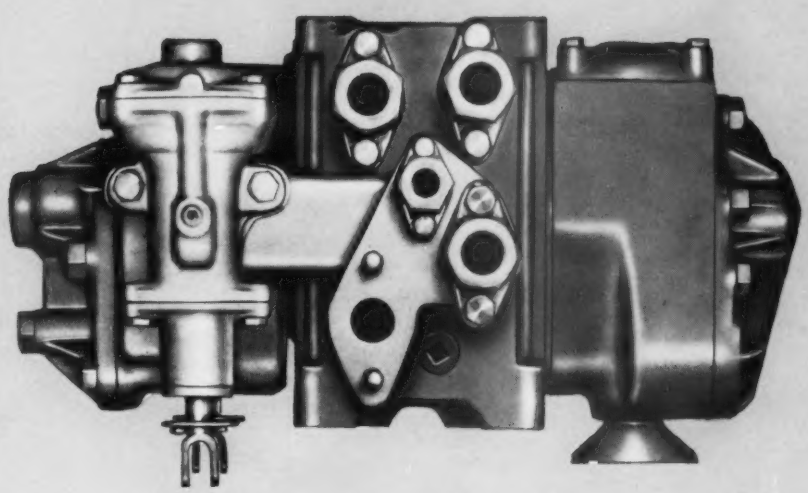

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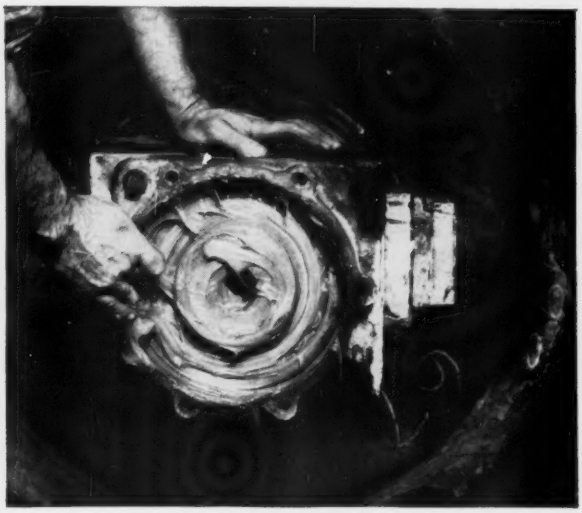

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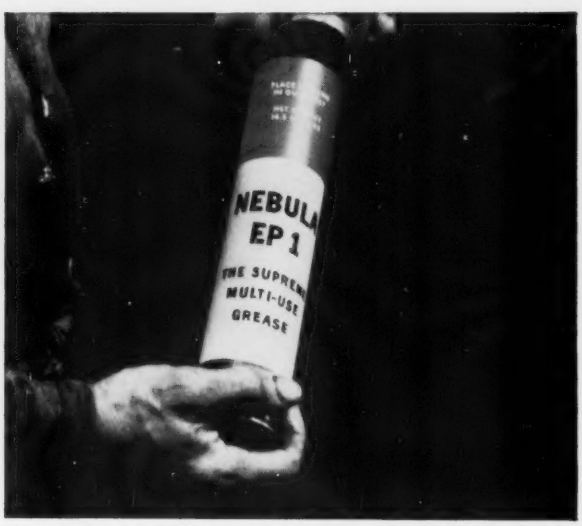

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